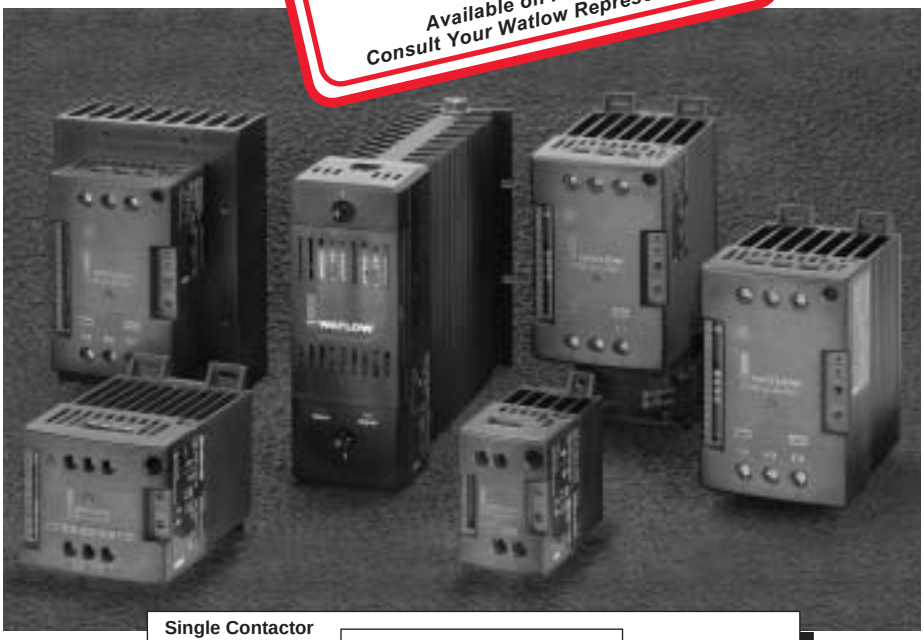
Power Controllers

DIN-A-MITE® Family

COMPLIES WITH EUROPEAN EMC DIRECTIVE
EN 61326 (1997-98) and EN 50178
Available on Request...
Consult Your Watlow Representative



Made in the United States of America, Watlow's DIN-A-MITE® family of solid state power controllers provides SCR control, heatsink, wiring and touch-safe exterior in one package. By designing the DIN-A-MITE® as a total power controller unit, the need to prep wires for terminals, find the right heat sink and determine adequate terminations is eliminated. It's a complete package you can install with Control Confidence®.

Performance Capabilities

Four DIN-A-MITE styles meet most power controller needs with ratings from 18 to 100 amps with voltages from 120 to 600V~(ac).

Features and Benefits

DIN-rail or sub-panel mounting

- Simple, fast installation

No mercury

- Environmentally safe product

Compact size

- Reduced panel space; less cost

Touch-safe exterior

Increased safety for installer/user

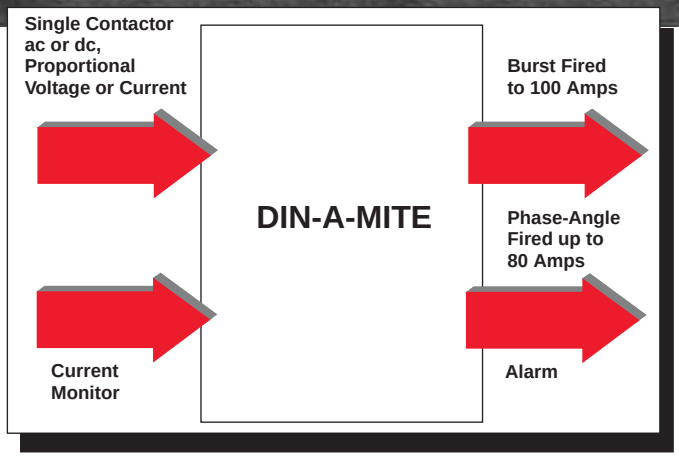
Easy Installation

Installation is simple and fast; saving time and money. All you have to do is strip wires and make connections.

- Sub-panel or DIN-rail mounting
- No drilling and tapping necessary
- Same footprint as comparably rated MDRs

Agency Approvals

- UL®508 listed and C-UL®
- UL®50, UL®1604, and CE



Achieve Optimum Temperature Control With Variable Time Base Control

Variable time base control meets the rapid switching demands of PID temperature control to deliver more accurate process control. It also increases heater life by reducing temperature over- and undershoot.

Low Electrical Noise

Burst firing switches ac current at zero cross (zero potential) to produce minimal RFI and EMI electric noise (radio frequency interference/electromagnetic interference). This low electrical noise quality helps prevent interference with sensor circuits and particularly sensitive equipment in your system.

Rugged, Back-to-Back SCR Design Insures Long Term Reliability

With solid state components, there's no limit on the number of switching cycles the DIN-A-MITE can perform. The four DIN-A-MITE styles meet most application requirements by tolerating harsh industrial environments, electrical spikes and dissipating less power. When properly applied, the DIN-A-MITE will outlast all other types of non-electronic power controllers.

UL® and C-UL® are registered trademarks of the Underwriter's Laboratories, Inc.

Power Controllers

DIN-A-MITE Family

Reduce Wear On Thermal System

With optional variable time base switching, the DIN-A-MITE automatically adjusts output cycle time to meet system demands. The benefits of this option are:

- Heater output equal to load demand
- Minimized temperature over- and undershoot

Terminal System Helps Prevent Wiring Failures

A proven high-current copper terminal design ensures optimum electrical connection to reduce heat build-up. This helps avoid connection failures and ensures overall wiring reliability. To further reduce “hot spots,” we've eliminated all unnecessary wires and fasteners which could possibly loosen, heat up and break down.

Compact Solid State Power Controller Delivers Big Performance in a Small Package

Watlow's DIN-A-MITE Style A, B, C and D power controllers provide a low-cost, highly compact and versatile solid state power control. What's more, no need to worry about mercury; all DIN-A-MITEs are mercury free and fit the same footprint as a comparably rated MDR. Each feature sub-panel mounting, while Styles A, B and C also have DIN-rail mounting capability.

Style A Capabilities

Style A capabilities include single-phase burst fire switching up to 25 amps at 600V~(ac) (see rating curve).

Variable time base, 4-20mA⎓(dc) process control or V~(ac)/ V⎓(dc) input contactor versions are available. All configurations are code number dependent and factory selectable, 50/60Hz independent.

Style B Capabilities

Style B capabilities include 1-phase and 3-phase burst fire up to 40 and 33 amps, respectively, at 600V~(ac) (see rating curve).

Variable time base, 4-20mA⎓(dc) process control or V~(ac)/V⎓(dc) input contactor versions are available. All configurations are code number dependent and factory selectable, 50/60Hz independent.

Style C Capabilities

Style C capabilities include 1-phase and 3-phase, 2-leg, and 3-phase, 3-leg burst fire, as well as 1-phase, phase-angle fire. Burst fire operation from 120 to 600V~(ac), phase angle operation from 120 to 600V~(ac). Current switching capabilities range from 30 to 80 amps depending on the model ordered (see output rating curve).

Input options include variable time base, 4-20mA⎓(dc) process control, linear voltage control, manual control or V~(ac)/V⎓(dc) contactor input. All configurations are code number dependent and factory selectable. All models are 50/60Hz independent.

Style D Capabilities

Style D capabilities include 1-phase switching up to 100 amps at 600V~(ac) and 30°C (86°F) (see rating curve). Limited 3-phase operation is possible by ganging two and/or three Style D DIN-A-MITE contactor inputs together.

Style D features on-board semiconductor fuses (accessible from the front). Application is further enhanced with optional current transformer option for external load current monitoring and “shorted SCR detector” on some models.

Variable time base, 4-20mA⎓(dc) process control or V~(ac)/ V⎓(dc) input contactor options are available. All configurations are code number dependent and factory selectable, 50/60Hz independent.

The standard sub-panel mounting footprint is equal to that of an industry standard mercury displacement relay.

DIN-A-MITE Style A, B, C and D Features

- **Faster switching** with solid state components. Better control saves energy and extends heater life.
- **Back-to-back SCR design** for increased durability.
- **Three-year warranty** assures Control Confidence®.

Style B and C Features

- **1- and 3-phase power** permits use in a variety of applications.
- **Shorted output detector** (optional) notifies a shorted SCR condition.

Style C Features

- **Open heater detector** (optional) notifies when a partial or totally open heater occurs.

Style D Features

- **On-board semiconductor fusing** provides quick access with no extra mounting necessary.
- **Optional load current monitor** detects changes in load current.

Applications

- Petroleum/chemical
- Ovens/furnaces
- Wave solder and reflow
- Packaging
- Foodservice equipment
- Semiconductor processing

Agency Approvals

- UL® 508 Listed, File #E73741
- C-UL® approved
- CE approved with proper line filter
- DIN-A-MITE Style C thru-wall mount is also UL®50 and UL®1604 approved.
- CE and EN 61326 Industrial Immunity Class A emissions with filter. EN 50178 safety directive

Power Controllers

DIN-A-MITE Family

	DIN-A-MITE Style A	DIN-A-MITE Style B	DIN-A-MITE Style C	DIN-A-MITE Style D
1-Phase①	Up to 25 amps @ 600V~(ac)	Up to 40 amps @ 600V~(ac)	Up to 80 amps @ 600V~(ac)	Up to 100 amps @ 600V~(ac)
3-Phase, 2-leg①	No	Up to 33 amps @ 600V~(ac)	Up to 80 amps @ 600V~(ac)	Gang 2 units
3-Phase, 3-leg①	No	Up to 22 amps @ 600V~(ac)	Up to 70 amps @ 600V~(ac)	Gang 3 units
V~(ac) & V⎓(dc) - Burst Fire Contactor Input	24, 120 & 240V~(ac) 4.5-32V⎓(dc)	24, 120 & 240V~(ac) 4.5-32V⎓(dc)	24, 120 & 240V~(ac) 4.5-32V⎓(dc)	24, 120 & 240V~(ac) 4.5-32V⎓(dc)
Multizone V~(ac) & V⎓(dc) Input	No	Yes	Yes	No
4-20mA⎓(dc) Input - Variable Time Base Output	Yes	Yes	Yes	Yes
Phase-Angle Fire Output②	No	No	Yes 1-phase only	No
Manual Control Via Potentiometer Input, or 0-5, 1-5 or 0-10V⎓(dc) Linear Voltage Input	No	No	Yes	No
Shorted SCR Alarm	No	Yes	Yes	Yes
Open Heater Alarm	No	No	Yes With "S" input only	No
Load Current Monitor CT	No	No	No	Yes
On Board Semiconductor Fusing	No	No	No	Yes
Din-Rail Mount	Yes	Yes	Yes	No
Sub-Panel Mount	Yes	Yes	Yes	Yes
Cabinet Thru-Wall Heatsink Mount UL® 50 and UL® 1604	No	No	Yes	No
Electrically Touch-Safe Package	Yes	Yes	Yes	Yes
Back-to-Back SCR Design	Yes	Yes	Yes	Yes
UL® 508 Listed/C-UL®/CE w/filter	Yes	Yes	Yes②	Yes
Dimensions	(95 X 45 X 98 mm) 3.7 H X 1.8 W X 3.9 in. D	(95 X 80 X 124 mm) 3.7 H X 3.1 W X 4.9 in. D	(150 X 80 X 146 mm) 6.0 H X 3.1 W③ X 5.7 in. D	(185 X 65 X 240 mm) 7.25 H X 2.5 W X 9.4 in.D
Controller Weight: kg (lbs)	0.32 (0.71)	0.68 (1.5)	1.18 (2.6)	2.95 (6.5)
Controller Weight w/fan: kg (lbs)	N/A	N/A	1.45 (3.2)	N/A

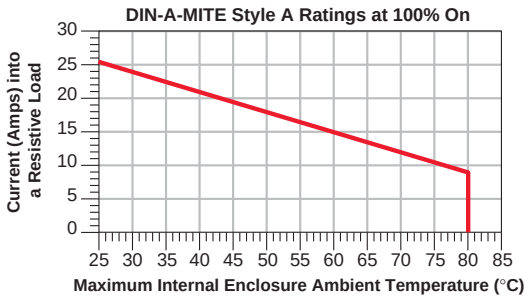
① Refer to curves on page 164 for your specific application ratings.
② Phase angle fire is not CE approved.
③ Will fit within the width dimension of most comparable MDRs.

Power Controllers

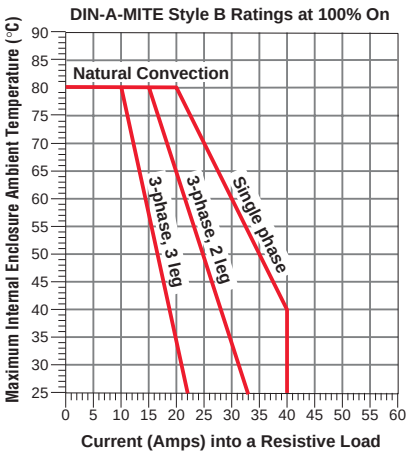
DIN-A-MITE Family

Output Current Rating Curves

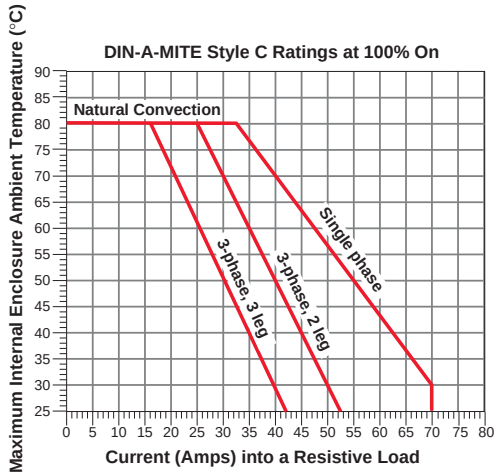
Style A


DIN-A-MITE Style A Ratings at 100% On
Current (Amps) into a Resistive Load
Maximum Internal Enclosure Ambient Temperature (°C)

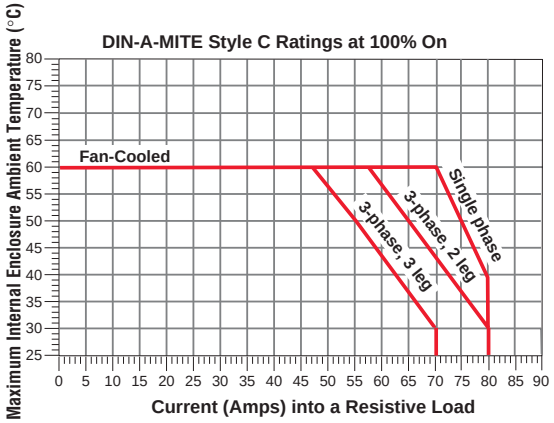
Style B


DIN-A-MITE Style B Ratings at 100% On
Maximum Internal Enclosure Ambient Temperature (°C)
Natural Convection
3-phase, 3 leg
3-phase, 2 leg
Single phase
Current (Amps) into a Resistive Load

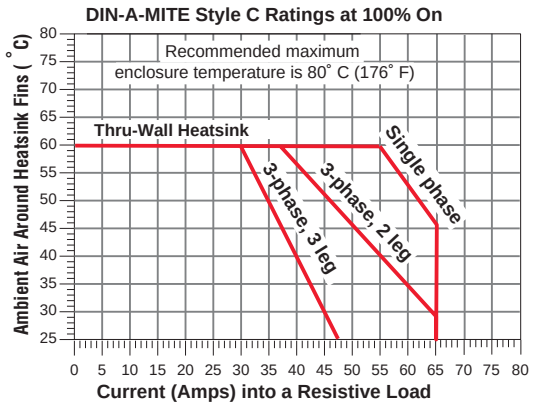
Style C


DIN-A-MITE Style C Ratings at 100% On
Maximum Internal Enclosure Ambient Temperature (°C)
Natural Convection
3-phase, 3 leg
3-phase, 2 leg
Single phase
Current (Amps) into a Resistive Load

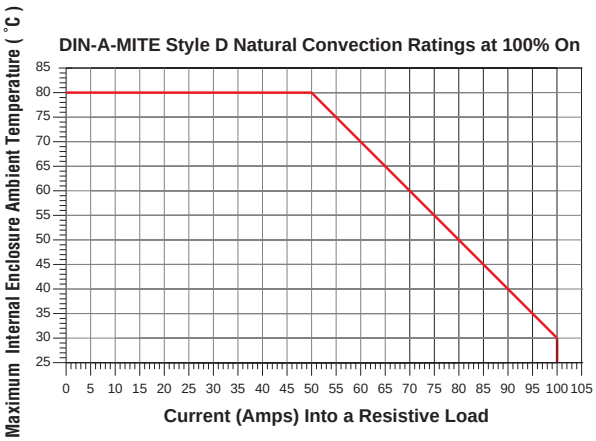
Style C - Fan Cooled


DIN-A-MITE Style C Ratings at 100% On
Maximum Internal Enclosure Ambient Temperature (°C)
Fan-Cooled
3-phase, 3 leg
3-phase, 2 leg
Single phase
Current (Amps) into a Resistive Load

Style C—Thru-Wall


DIN-A-MITE Style C Ratings at 100% On
Ambient Air Around Heatsink Fins (°C)
Recommended maximum
enclosure temperature is 80° C (176° F)
Thru-Wall Heatsink
3-phase, 3 leg
3-phase, 2 leg
Single phase
Current (Amps) into a Resistive Load

Style D


DIN-A-MITE Style D Natural Convection Ratings at 100% On
Maximum Internal Enclosure Ambient Temperature (°C)
Current (Amps) Into a Resistive Load

Power Controllers

DIN-A-MITE Family

Specifications Common To Styles A, B, C and D

Control Mode-Burst Fire

- V~(ac) input contactor
- V⎓(dc) input contactor
- 4-20mA⎓(dc) variable time base control

Operator Interface

- Command signal input
- Input signal indication LED

Input

- V~(ac): 24, 120, 240 nominal - 25mA maximum per controlled leg
- V⎓(dc): 4.5 to 32V⎓(dc): maximum current @ 4.5V is 6mA per leg. Add 2mA per LED used to the total current
- 4-20mA⎓(dc) loop powered: 375Ω input impedance

Output Voltage

- 120-240V~(ac) units: 48V~(ac) minimum to 265V~(ac) maximum
- 277-600V~(ac) units: 85V~(ac) minimum to 660V~(ac) maximum
- Off state leakage 1mA⎓(dc) at 25°C (77°F) maximum

Operating Environment

- Up to 80°C (176°F),[3] see output rating curve for specific application

Storage Temperature

- -40 to 85°C (-40 to 185°F)

Mounting

Options include DIN-rail[1] or standard sub-panel mounting

- The DIN-rail specification is: DIN EN 50022, 35 mm x 7.5 mm

Specifications Unique To Each Style

Multizone Input— Styles B & C

- V~(ac) input contactor
- V⎓(dc) input contactor
- Available 2 and 3 leg only

Amperage—Style A

- 1-phase, 24 amp output maximum at 30°C (86°F) into a resistive load[3]
- Maximum surge current for 16.6mSec. 380 amps peak
- Maximum I^2t for fusing 4,000 A^2 Sec.

Amperage—Style B

- 1-phase and 3-phase models. See output rating curves on page 164
- Maximum surge current for 16.6mSec. 380 amps peak
- Maximum I^2t for fusing 4,000 A^2 Sec.

Amperage—Style C

- Natural convection and fan cooled, in 1-phase and 3-phase models. See output rating curves on page 164
- Maximum surge current for 16.6mSec. 1350 amps peak
- Maximum I^2t for fusing 9100 A^2 Sec.

Style C—Phase Angle Firing[2]

- 1-phase operation
- Line voltage compensation
- Soft start (4 seconds) on power up
- Missing half cycle detection (engages ESD and restarts soft)
- Optional current limit feature
- Linear voltage/current or manual control input. 5kΩ input impedance for voltage and 250 ohms for 4-20mA
- 120, 208, 240, 277, 400, 480, and 600V~(ac) operation. Model number dependent

Style C—Single Cycle Variable Time Base

- 1-phase and 3-phase operation
- Linearized input to output
- Linear voltage/current or manual control input. 5kΩ input impedance for voltage and 250 ohms for 4-20mA
- 120, 208, 240, 277, 400, 480, and 600V~(ac) operation. Model number dependent

Amperage—Style D

- 1-phase, 100 amp output maximum at 30°C (86°F)[3]
- Maximum surge current for 16.6mSec. 1800 amps peak
- Maximum I^2t for fusing 20,000 A^2 Sec.

Shorted Output Alarm Option—Styles B, C & D

- Triac output
- 24 to 240V~(ac), 300mA @ 25°C, 125mA @ 80°C (176°F)
- Energizes on alarm
- Holding current 200µA minimum
- Latching current 5mA typical

Terminals—Styles A & B

- Compression - will accept #8-18 AWG wire (8.4 mm^2 - 0.82 mm^2)

Terminals—Style C

- Compression - will accept #4-14 AWG wire (21.2 mm^2 - 2.1 mm^2)

Terminals—Style D

- Compression - will accept #2-6 AWG wire (33.6 mm^2 - 13.3 mm^2)

Mounting—Style D

- Standard sub-panel mounting; fits the same mounting pattern as a 100 amp 1-phase MDR
- Mounting holes offer clearance for #10 screw
- On-board semiconductor fusing, Bussmann P/N 170N3437

Current Sensing—Style D

- On-board current transformer, 0.2V~(ac) output signal per amp load current into 1000Ω load

[1] Not available on Style D
[2] Style C phase angle fire is not CE approved
[3] See output current rating curves, page 164.

Power Controllers

F.O.B. Winona, Minnesota

Style A

Availability

All combinations available in three working days or less.

CE approved product. Must use CE filter listed on page 190 for conducted emission.

Ordering Information

To order, complete the code number on the right with the information below.

DIN-A-MITE **D A 1 0 - _ _ - 0**

Style A = Solid state power controller

Phase

1 = 1-phase, 1 controlled leg

Cooling and Current Rating

0 = Natural convection current rating 18A @ 50˚C (122˚F)
(See derating curve for current rating at other temperatures)

Line and Load Voltage

02 = 24 to 48V~(ac)
24 = 100 to 240V~(ac)
60 = 277 to 600V~(ac)

Input Type

C0 = 4.5 to 32V⎓(dc) contactor
F0 = 4 to 20mA⎓(dc) proportional
K1 = 22 to 26V~(ac) contactor
K2 = 100 to 120V~(ac) contactor
K3 = 200 to 240V~(ac) contactor

Manual Language

0 = English
1 = German
2 = Spanish
3 = French

Custom parts Designation

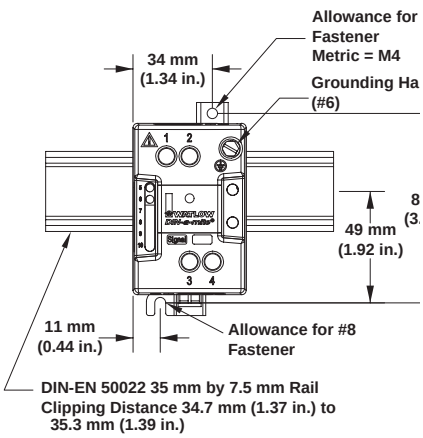
00 = Standard parts

Recommended Semiconductor Fuses and Fuse Kits

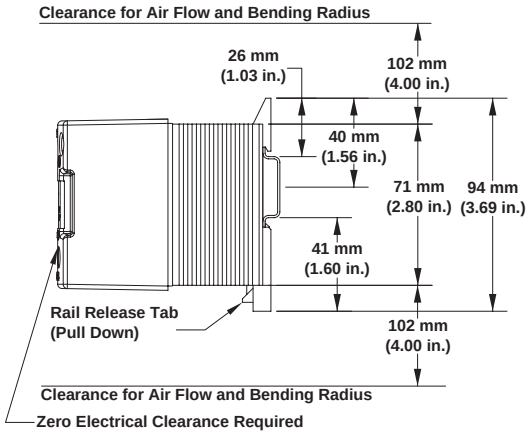
See page 191 for listings and part numbers.

Style A Dimensions

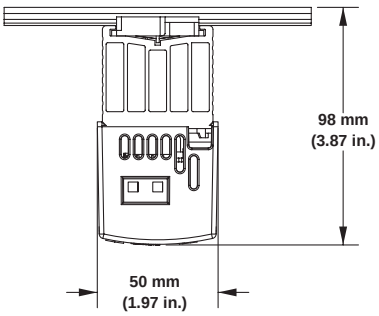
Front


Allowance for Fastener Metric = M4
34 mm (1.34 in.)
Grounding Ha (#6)
49 mm (1.92 in.)
11 mm (0.44 in.)
Allowance for #8 Fastener
DIN-EN 50022 35 mm by 7.5 mm Rail Clipping Distance 34.7 mm (1.37 in.) to 35.3 mm (1.39 in.)

Side


Clearance for Air Flow and Bending Radius
26 mm (1.03 in.)
102 mm (4.00 in.)
40 mm (1.56 in.)
71 mm (2.80 in.)
94 mm (3.69 in.)
41 mm (1.60 in.)
Rail Release Tab (Pull Down)
102 mm (4.00 in.)
Clearance for Air Flow and Bending Radius
Zero Electrical Clearance Required

Top



Power Controllers

F.O.B.: Winona, Minnesota

Style B

Ordering Information

To order, complete the code number on the right with the information below.

DIN-A-MITE **D B - - -**

Style B = Solid state power controller

Phase

1 = 1-phase, 1 controlled leg
2 = 3-phase, 2 controlled legs
3 = 3-phase, 3 controlled legs
8 = 2 independent zones (Input Type C or K)
9 = 3 independent zones (Input Type C or K)

Cooling and Current Rating Per Pole

0 = Natural convection standard DIN-rail or panel mount heatsink

Line and Load Voltage

02 = 24 to 48V~(ac)
24 = 120 to 240V~(ac)
60 = 277 to 600V~(ac)

Input Control Signal

C0 = 4.5 to 32V⎓(dc) contactor
F0 = 4 to 20mA⎓(dc) proportional
K1 = 22 to 26V~(ac) contactor
K2 = 100 to 120V~(ac) contactor
K3 = 200 to 240V~(ac) contactor

Alarm

0 = No alarm
S = Shorted SCR alarm (not available with options 8, and 9 above)

User Manual

0 = English
1 = German
2 = Spanish
3 = French

Custom Part Numbers

00 = Standard part
XX = Any letter or number, custom options, labeling, etc.

Recommended Semiconductor Fuses and Fuse Kits

See page 191 for listings and part numbers.

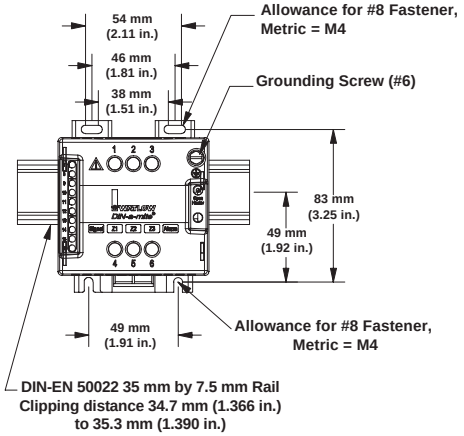
Availability

All combinations available in three working days or less.

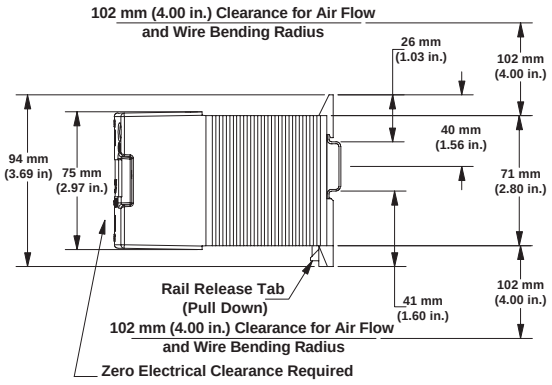
CE approved product. Must use CE filter listed on page 190 for conducted emission.

Style B Dimensions

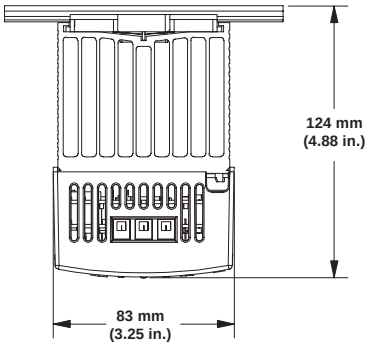
Front


54 mm (2.11 in.)
46 mm (1.81 in.)
38 mm (1.51 in.)
Allowance for #8 Fastener, Metric = M4
Grounding Screw (#6)
83 mm (3.25 in.)
49 mm (1.92 in.)
49 mm (1.91 in.)
Allowance for #8 Fastener, Metric = M4
DIN-EN 50022 35 mm by 7.5 mm Rail Clipping distance 34.7 mm (1.366 in.) to 35.3 mm (1.390 in.)

Side


102 mm (4.00 in.) Clearance for Air Flow and Wire Bending Radius
26 mm (1.03 in.)
102 mm (4.00 in.)
40 mm (1.56 in.)
94 mm (3.69 in)
75 mm (2.97 in.)
71 mm (2.80 in.)
Rail Release Tab (Pull Down)
41 mm (1.60 in.)
102 mm (4.00 in.)
102 mm (4.00 in.) Clearance for Air Flow and Wire Bending Radius
Zero Electrical Clearance Required

Top



Power Controllers

F.O.B. Winona, Minnesota

Style C

Current Rating Table

Phase	Cooling	Current at 50˚C (122˚F)
1	0	55A
1	T	60A
1	(1,2,3)	75A
2, 8	0	40A
2, 8	T	45A
2, 8	(1,2,3)	65A
3, 9	0	30A
3, 9	T	35A
3, 9	(1,2,3)	55A

Availability

All combinations available in three working days or less.

CE approved product. Must use CE filter listed on page 190 for conducted emission.

Ordering Information

To order, complete the code number on the right with the information below:

D C - - -

Style C = Zero cross solid state power controller in natural and forced air cooled versions

Phase

1 = 1-phase, 1 controlled leg
2 = 3-phase, 2 controlled legs
3 = 3-phase, 3 controlled legs (use with four wire wye)
8 = 2 independent zones (Input Type C, K)
9 = 3 independent zones (Input Type C, K)

Cooling and Current rating Per Leg (see table on left)

0 = Natural convection standard Din-rail or panel heatsink
1 = Fan cooled 120V~(ac) standard Din-rail or panel heatsink
2 = Fan cooled 240V~(ac) standard Din-rail or panel heatsink
3 = Fan cooled 24V⎓(dc) standard Din-rail or panel heatsink
T = Natural convection through wall or cabinet heatsink (NEMA 4X)

Line and Load Voltage

02 = 24 to 48V~(ac) (Control C, F, K)
24 = 100 to 240V~(ac) (Control C, F, K)
60 = 277 to 600V~(ac) (Control C, F, K)

Input Control Signal

C0 = 4.5 to 32V⎓(dc) contactor
F0 = 4 to 20mA⎓(dc) proportional
K1 = 22 to 26V~(ac) contactor
K2 = 100 to 120V~(ac) contactor
K3 = 200 to 240V~(ac) contactor

Alarm

0 = No alarm
S = Shorted SCR alarm (not available with options 8, and 9 above)

Language

0 = English
1 = German
2 = Spanish
3 = French

Custom Part Numbers

00 = Standard part
XX = Any letter or number, custom options, labeling, etc.

Recommended Semiconductor Fuses and Fuse Kits

See pages 191 for listings and part numbers.

Note: Allow one fuse and one holder per leg fused. Example, a 3-phase, 2-leg DIN-A-MITE requires two fuses and two holders.

Power Controllers

F.O.B.: Winona, Minnesota

Style C

Style C Enhancements

Option

- Manual Control Kit for process input cards (1kΩ potentiometer) order #08-5362 separately.

Current Rating Table

Phase	Cooling	Current at 50˚C (122˚F)
1	0	55A
1	T	60A
1	(1,2,3)	75A
2	0	40A
2	T	45A
2	(1,2,3)	65A
3	0	30A
3	T	35A
3	(1,2,3)	55A

CE approved product. Must use CE filter listed on page 190 for conducted emission.

Ordering Information

To order, complete the code number on the right with the information below:

D C - - -

Style C = Zero cross and phase-angle fired solid state power controller in natural and forced air cooled versions.

Phase

1 = 1-phase, 1 controlled leg
2 = 3-phase, 2 controlled legs
3 = 3-phase, 3 controlled legs (use with four wire wye)

Cooling and Current Rating Per Leg (see table on left)

0 = Natural convection standard Din-rail or panel heatsink
1 = Fan cooled 120V~(ac) standard Din-rail or panel heatsink
2 = Fan cooled 240V~(ac) standard Din-rail or panel heatsink
3 = Fan cooled 24V⎓(dc) standard Din-rail or panel heatsink
T = Natural convection through wall or cabinet heatsink (NEMA 4X)

Line and Load Voltage

12 = 100 to 120V~(ac) (Control L, P, S)
20 = 200 to 208V~(ac) (Control L, P, S)
24 = 230 to 240V~(ac) (Control L, P, S)
27 = 277V~(ac) (Control L, P, S)
40 = 400V~(ac) (Control L, P, S)
48 = 480V~(ac) (Control L, P, S)
60 = 600V~(ac) (Control L, P, S)

Input Control Signal

L (0 to 5) = Phase-angle with current limiting① (DC1 only, Alarm 0 only, includes one current transformer - Single-phase only)
P (0 to 5) = Phase-angle① (DC1 only, Alarm 0 only - Single-phase only)
S (0 to 5) = Single cycle variable time base
(Select one of the following input options for L, P, S (0 to 5))
0 = 4 to 20mA
1 = 12 to 20mA (single cycle variable time base only - option 'S')
2 = 0 to 20mA
3 = 0 to 5V⎓(dc) proportional
4 = 1 to 5V⎓(dc) proportional
5 = 0 to 10V⎓(dc) proportional

Alarm

0 = No alarm
S = Shorted SCR alarm (for zero cross models only)
H = Open-heater and shorted-SCR alarm (for input control signal options S only)
1-phase, 1 controlled leg
3-phase, 2 controlled legs
3-phase, 3 controlled legs

Language

0 = English
1 = German
2 = Spanish
3 = French

Custom Part Numbers

00 = Standard part
10 = 1-second soft start (Control option P, L)
XX = Any letter or number, custom options, labeling, etc.

① Phase angle models are not CE approved for conducted emissions.

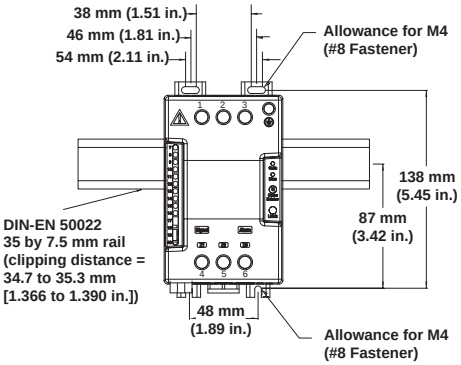
Power Controllers

Style C

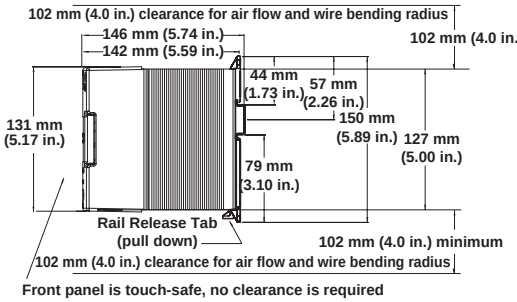
Style C Dimensions

Without Cooling Fan

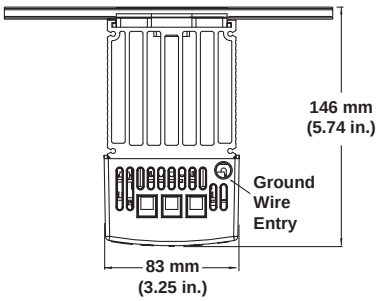
Front



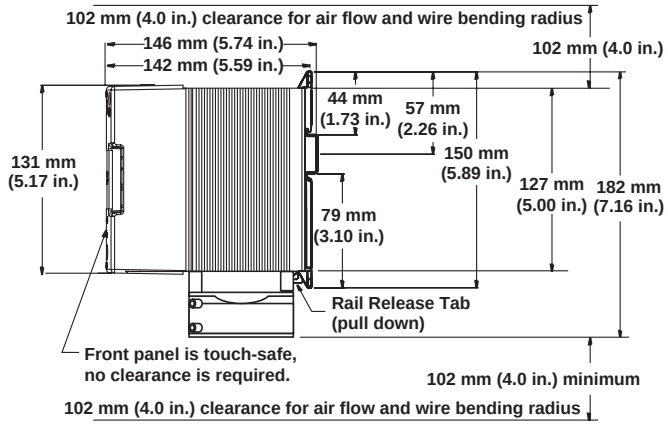
Side



Top

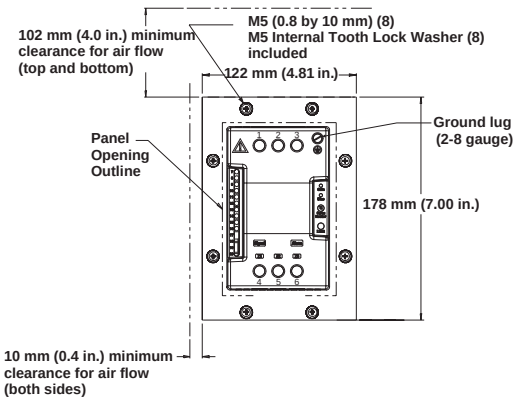


With Cooling Fan

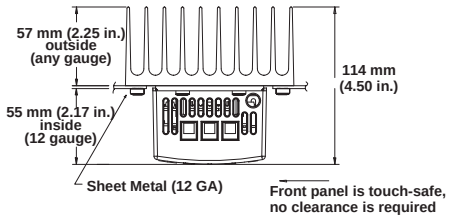


Thru-Wall DIN-A-MITE Style C[1]

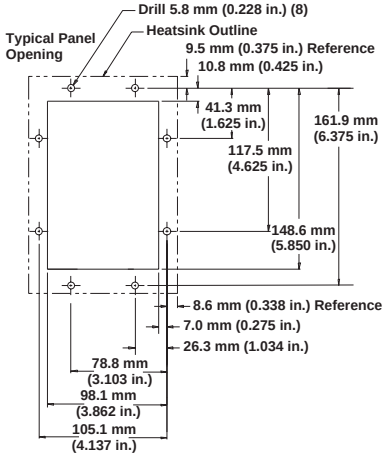
Front



Top



Panel Cutout



[1] With the potential for high thru-wall heatsink temperatures, application may require a touch-safe shield. See amperage curves on page 164 for details.

Power Controllers

F.O.B.: Winona, Minnesota

Style D

Availability

All combinations available in three working days or less.

CE approved product. Must use CE filter listed on page 190 for conducted emission.

Ordering Information

To order, complete the code number on the right with the information below:

D D 1 0 - - -

Style D = Solid state power controller

Phase

1 = 1-phase, 1 controlled leg

Cooling and Current Rating

0 = Natural convection current rating 80A @ 50˚C (122˚F)

Line and Load Voltage

02 = 24 to 48V~(ac)
24 = 100 to 240V~(ac)
48 = 277 to 480V~(ac)
60 = 277 to 600V~(ac)

Input Control Signal

C0 = 4.5 to 32V⎓(dc) contactor
F0 = 4 to 20mA⎓(dc) proportional
K1 = 22 to 26V~(ac) contactor
K2 = 100 to 120V~(ac) contactor
K3 = 200 to 240V~(ac) contactor

Current Sensing or Alarm

0 = No alarm
1 = Load current transformer
S = Shorted SCR alarm

User Manual Language

0 = English
1 = German
2 = Spanish
3 = French

Custom Options

00 = Standard parts

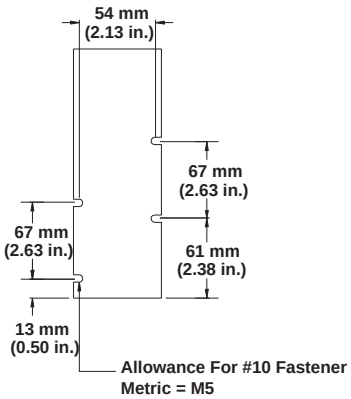
Recommended Semiconductor Fuses

Bussmann part number 170N3437 65 amp® 660V~(ac), Watlow part number 0808-0096-0000 requires two fuses per Style “D” DIN-A-MITE. These should be replaced in pairs.

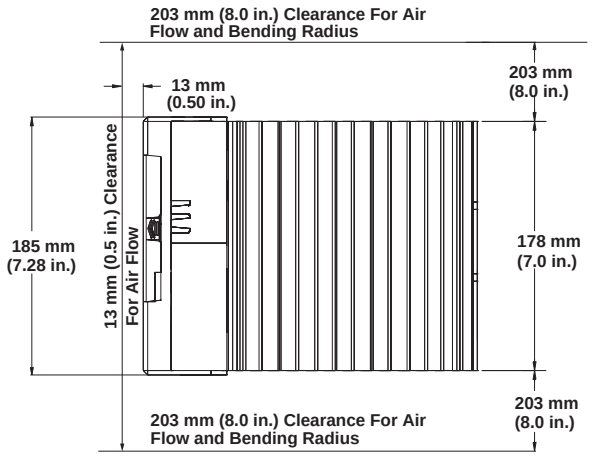
Style D Dimensions

Footprint

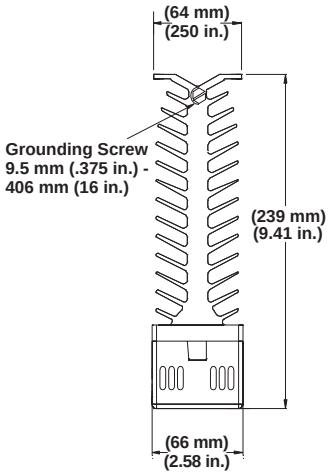
Same mounting footprint as industry standard mercury displacement relays.



Side

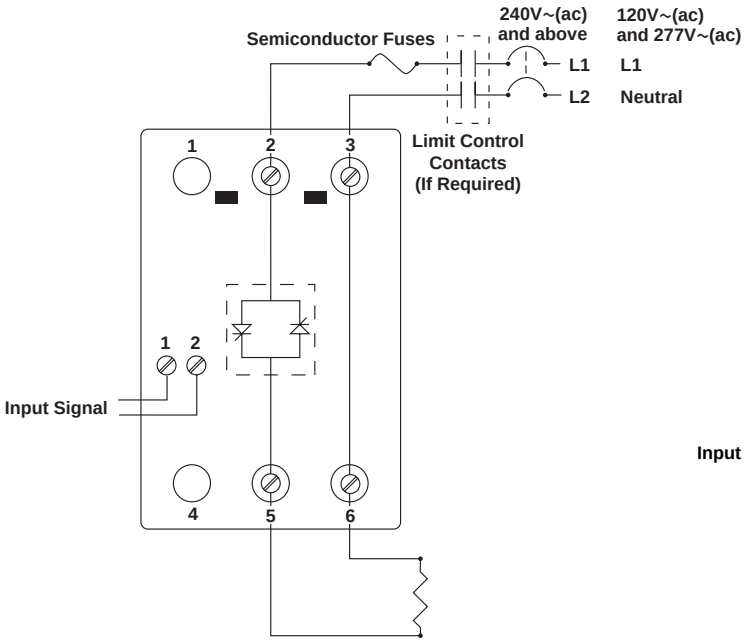


Top

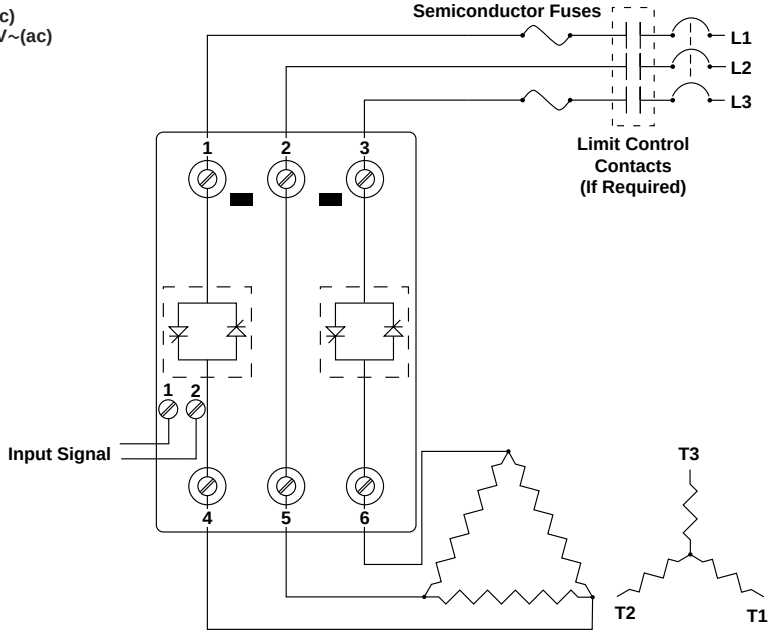


System Diagram Examples

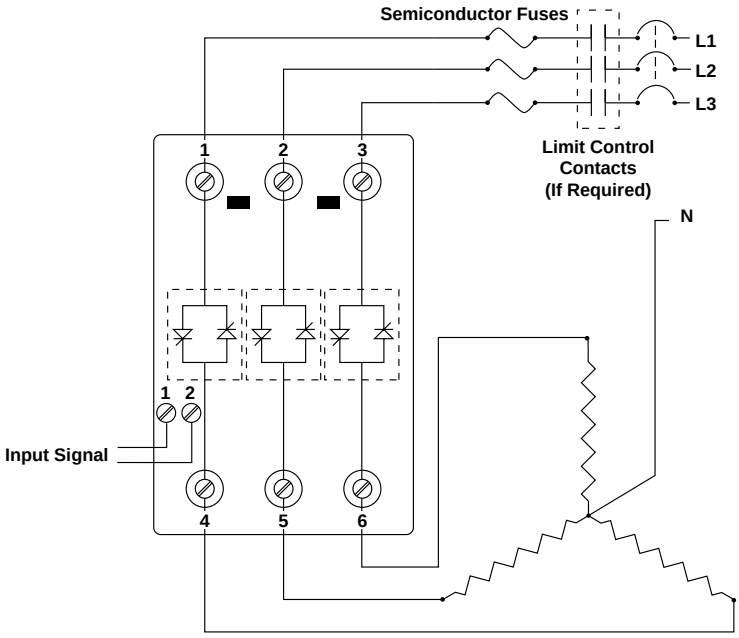
1-Phase Output, Styles A, B and C



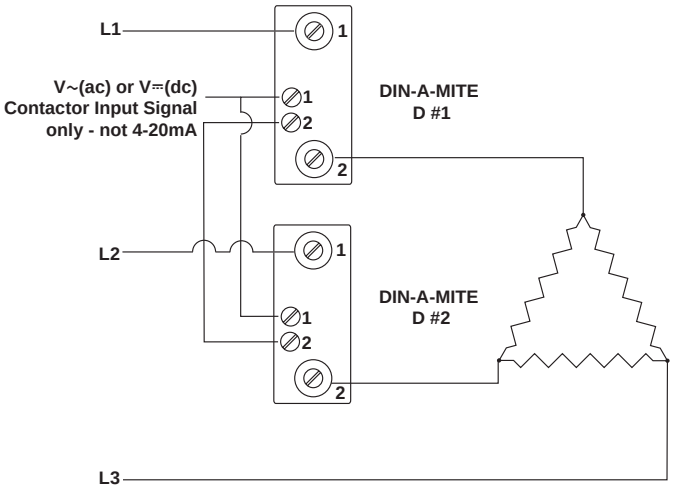
3-Phase, 2-Leg Output, Styles B and C



3-Phase, 3-Leg, 4-Wire Output, Styles B and C



3-Phase, 2-Leg Output, with Two Style D's



Power Controllers

SERIES CZR

The SERIES CZR solid state contactor provides a low-cost, highly compact and versatile solid state option for controlling electric heat. With din-rail and back panel mounting standard on every controller, the CZR allows for simple and quick installation.

The extensive capabilities of the SERIES CZR include single-phase, 18 to 50 amp zero-cross and random switching up to 600V~(ac) (see output rating curve). The unique integrated design removes the guesswork associated with selecting a proper heat sink and precise terminations for the application.

SERIES CZR contactors are available in V⎓(ac/dc) input contactor versions. All configurations are model number dependent and factory selectable.

The SERIES CZR is reliably backed by a two-year warranty from Watlow Winona.

Performance Capabilities

- Output 18 to 50 amps
- Output voltage up to 660V~(ac)

Features and Benefits

DIN-rail or standard panel mount

- Versatile, quick and low-cost installation

Compact size

- Reduces panel space; less cost

Touch-safe terminals

- Increase safety for installer and operator

Mercury-free

- Environmentally safe

Faster switching with solid state

- Saves energy and extends heater life

Agency Approvals

- UL® recognized, CSA certified, VDE and CE
- Applications requiring agency approval

Back-to-back SCR design

- Rugged design

Specifications

Control Mode

- Zero-cross or random fired contactor output

Operator Interface

- Command signal input
- Input signal indication LED

Input Command Signal

- Input Type DC1
  - Turn on voltage 4V⎓(dc) max., turn off voltage 1V⎓(dc) min.
  - Input current: dc typically 10mA @ 4V⎓(dc),13mA @ 32V⎓(dc)
- Input Type AC1
  - 90 to 140Vrms, must turn on at 90V~(ac), must turn off at 10V~(ac)
  - Input current: 15mA typical @120V~(ac)
- Input Type AC2
  - 18 to 36V~(ac) input, must turn on at 18V~(ac), must turn off at 10V~(ac)
  - Input current: 10mA typical @ 24V~(ac)

Output Voltage

- 24 volt; 24V~(ac) min. to 280V~(ac) max.
- 480 volt; 48V~(ac) min. to 530V~(ac) max.
- 600 volt; 48V~(ac) min. to 660V~(ac) max. (not available on 18 amp version)
- Off state leakage 1mA at 25°C (77°F) max. for 600V~(ac) models; 10mA at 25°C (77°F) max. for 24 through 480V~(ac) models
- Holding current: 250mA max.

Output Amperage

- See output rating curve. Ratings are into a resistive heater load

Output Amperage Rating

Model	18	24	34
Maximum Surge Current 16.6 mSec	625	250	625
Maximum I^2t for fusing	1,620	260	1,620

Model	42	50
Maximum Surge Current 16.6 mSec	1,000	1,000
Maximum I^2t for fusing	4,150	6,000

SERIES CZR

Specifications Cont.

Agency Approvals

- Class II construction
- UL® 508 recognition, File #E73741 and CSA File LR 700195
- 73/23/EEC CE Low Voltage Directive
- VDE 0805, registration number 126921
  - License number 136037 for 18 amp models
  - License number 130515 for 24 to 50 amp models

Output Terminals

- Compression type
- For 18 amp models:
  - Maximum wire size 3.0 mm (10 AWG), torque to 0.6 Nm (5.3 in. lbs)
- For 24 to 50 amp models:
  - Maximum wire size 16.0 mm (6 AWG stranded) torque to 1.5-1.7 Nm (13-15 in. lbs)

Operating Environment

- Up to 80°C (176°F). See output rating curves for your application.
- 0 to 90 percent RH, non-condensing
- Insulation only tested to 3,000 meters
- Units are suitable for “pollution degree 2”
- Cycle time should be less than three seconds

Mounting

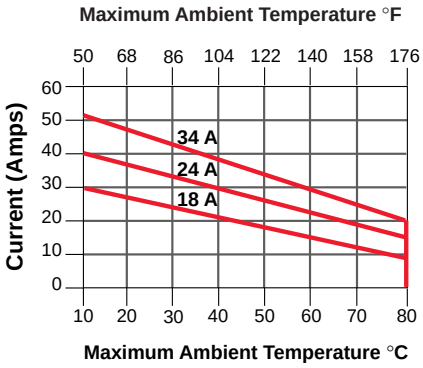
Options include DIN-rail or standard back panel mounting.

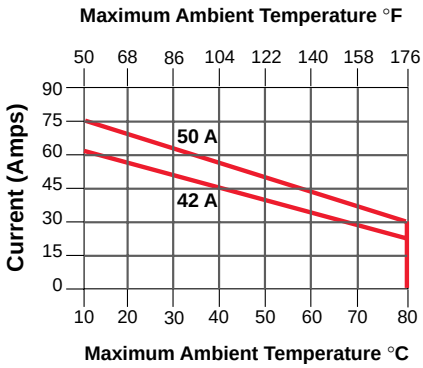
- The DIN-rail specification: DIN EN 50022, 35 mm x 7.5 mm (1.37 in. x 0.30 in.)
- Minimum clipping distance: 34.8 mm (1.37 in.)
- Maximum clipping distance: 35.3 mm (1.39 in.)
- Mount cooling fins vertical

Weight/Dimensions

- 260 g (9.2 oz)
- 24 to 50 amp models: 100 mm (3.95 in.) high x 45 mm (1.75 in.) wide x 109 mm (4.3 in.) deep
- 18 amp models: 100 mm (3.95 in.) high x 22.6 mm (0.89 in.) wide x 99 mm (3.9 in.) deep

Output Rating Curves


Maximum Ambient Temperature °F
50 68 86 104 122 140 158 176
Current (Amps)
60 50 40 30 20 10 0
34 A
24 A
18 A
10 20 30 40 50 60 70 80
Maximum Ambient Temperature °C


Maximum Ambient Temperature °F
50 68 86 104 122 140 158 176
Current (Amps)
90 75 60 45 30 15 0
50 A
42 A
10 20 30 40 50 60 70 80
Maximum Ambient Temperature °C

Ordering Information

To order, complete the code number to the right with the information below:

C - A V - 0

Control Mode

R = Random
Z = Zero-cross

Output Amperage

18 = 18 amp (not available with 600V output)
24 = 24 amp
34 = 34 amp
42 = 42 amp
50 = 50 amp

Output Voltage

24 = 24 to 280V~(ac)
48 = 48 to 530V~(ac)
60 = 60 to 660V~(ac) (not available with 18A model)

Input Type (Contactor)

DC1 = 4 to 32V⎓(dc)
AC1 = 90 to 140V~(ac)
AC2 = 18 to 36V~(ac)

Note: Do not use the AC1 and AC2 input type models with temperature control outputs that include an AC snubber filter. This could cause the CZR to stay full on.

Power Controllers

POWER SERIES

Watlow has manufactured solid state power controllers for over 30 years. Watlow's POWER SERIES represents the latest in SCR power controller technology. This microprocessor-based product offers features and application flexibility unmatched by any other SCR power controller on the market today.

Capabilities of Watlow's POWER SERIES controllers include single-phase and three-phase models from 65 to 250 amps. Field configurable phase-angle or zero cross firing improves application flexibility on site where you need it. The 50/60Hz independent operation allows utilization almost everywhere in the world without special calibration considerations. Serial communication utilizing Modbus™ protocol provides remote control setup and monitoring of load status from a nearby computer station or control room.

On-board semiconductor fusing improves reliability by protecting the SCRs from heater short circuits. Plus, on-board heater bakeout and control diagnostics can help eliminate initial start up problems. All these benefits are in a touch-safe package that can be quickly and easily mounted in your control cabinet.

Watlow's POWER SERIES controllers are UL® listed and C-UL®, so users can be assured that the controllers meet world safety and operational standards.

Performance Capabilities

- 65 to 250 amps
- Up to 660V~(ac)

Features and Benefits

Microprocessor-based technology

- Extremely versatile, field configurable

Snap-fit on a pre-mounted plate

- Easy installation

Models 65 through 250 amp ratings

- Handles a wide range of loads

Adjustable soft start

- Provides application flexibility

Heater and control diagnostics capabilities

- Monitor actual heater and control performance

Electrically touch-safe package

- Increased safety for installer and users

Serial communications with Modbus™ RTU protocol

- Computer control and/or monitoring

Multizone capability

- Increased application flexibility, reduced panel space

Specifications

Power Bases

- Single-phase, (2 SCRs)
- 3-phase, 2-leg control, (4 SCRs), resistive load only, zero cross firing only
- 3-phase, 3-leg control, (6 SCRs)
- 3-phase, 3-leg control, (6 SCRs) for 4-wire wye loads
- Multizone, two and three single-phase zones

Output Control Options

- Zero cross control, fixed time base
- Time base one or four seconds with digital programmer
- Zero cross control, variable time base
- Phase-angle control and phase-angle control with current limit (not for 3-phase, 2-leg models)
- Soft start factory default four seconds upon power-up, and adjustable from 0.0 to 120 seconds

Modbus™ is a registered trademark of Schneider Automation, Inc.

POWER SERIES

Specifications Cont.

- Soft start upon input signal change, output rate of change adjustable to limit max rate of change from 0.1 to 100 percent per 0.1 second. Factory default 10 percent
- Current transformer included when required
- Line voltage compensated (variable time base and phase angle controllers only)
- Standby or non-operational mode

Output Voltage and Current Rating

- 24 to 120V~(ac) (+10 percent, -15 percent)
- 200 to 480V~(ac) (+10 percent, -15 percent)
- 200 to 600V~(ac) (+10 percent, -15 percent)
- 65 through 250 amps per pole, model dependent; see Output Amperage Chart page 178
- Minimum load 1 amp rms ac
- Maximum leakage current 5mA

Alarms

- Single alarm relay
- Latching or non-latching
- Separate high and low values
- Alarm silencing (inhibit) on power up for alarm
- Alarm indication LEDs, shorted SCR, open heater
- Electromechanical relay, form C contact, software configurable
- Minimum load current 10mA @ 5V⎓(dc)
- Rated resistive loads: 3 amps @ 250V~(ac) or 30V⎓(dc) max., inductive load rating 1.5 amps with a power factor ≥ 0.4 without contact suppression

Heater Bakeout

- For single-phase (phase to neutral) and 3-phase 6 SCR models only (not for 3-phase, 2-leg models)
- Soft start with over current trip, runs until programmed bakeout time expires, then goes burst or phase-angle firing. Factory default of 24 hours
- Adjustable 0 - 9999 minutes with over current trip
- Internal current transformer included

Command Signal Input

Analog

- Field selectable linear voltage and current of low and high points within 0-20mA and 0-10V⎓(dc)
- Manual control input through front panel as a percent power
- Factory default 4-20mA input
- Voltage input impedance 11kΩ nominal
- Current input impedance 100Ω nominal

Digital

- On-board digital programmer/display and optional serial communications

Retransmit

- Field selectable and scalable within 0-20mA, 800Ω maximum or 0-10V⎓(dc), load, 1KΩ minimum load. The default is 4-20mA
- Resolution:

  mA ranges = ±5µA nominal

  V⎓(dc) = ranges 2.5mV nominal
- Calibration accuracy:

  mA ranges = ±20µA

  V⎓(dc) ranges = 10mV nominal
- Temperature stability: 100ppm°C

Digital Programmer/Display and Communications Capabilities

- Programming functions
- Adjust input and output control type, alarms and soft start, heater bakeout and current limit prompts
- Monitoring functions
- Display input and output values along with actual output current
- Data retention of digital programmer/display upon power failure via nonvolatile memory

Serial Communications

- RS-232 for single drop control
- EIA-485 for single or multidrop control
- 32 units maximum can be connected. With additional 485 repeater hardware, up to 247 units may be connected
- Isolated
- Modbus™ RTU protocol
- 1200, 2400, 4800, 9600, 19200 baud rates

Controller Power Supply

- Universal line voltage input range 100 to 240V~(ac) (+10 percent, -15 percent) at 55VA max
- 50/60Hz ± 5 percent line frequency independent
- Controller line voltage for electronic power supply can be run on separate line voltage

Natural Convection and Fan Cooled Models

- Cabinet venting may be required
- See chart on page 178 for models that include fan cooling

Power Dissipation (Watts)

- Approximately 1.25 watts/amp per controlled leg

Power Controllers

POWER SERIES

Specifications Cont.

Isolation

- Command signal to load and line/load to ground 2200V~(ac) minimum
- On-board semiconductor fuses provide SCR protection

Mounting

- Mounts on a removable subplate
- Heat sink fins must be mounted in vertical orientation

High Current Terminals

- Touch safe
- 10 mm (0.375 in.) Allen head compression terminals will accept #6 AWG to 350 MCM wire. Allen wrench adapter (included) for 10 mm (0.375 in.) socket, 6 point only
- Torque to 180 in.-lbs (20.3 Nm)
- Wire strip to 30 mm (1.125 in.)

Controller Terminals

- Touch safe
- 2.5 mm (0.125 in.) blade screw-driver, accepts 12-22 AWG or 2 No. 22-18 AWG wires
- Torque to 8 in.-lbs (0.9 Nm)
- Wire strip to 6 mm (0.24 in.)

Operating Environment

- 50°C (122°F) base rating
- 0 to 60°C (32 to 140°F) fan cooled
- 0 to 65°C (32 to 149°F) natural convection cooled
- 0 to 90 percent RH, non-condensing
- Meets EN50178, pollution degree three

Storage Temperature

- -40 to 85°C (-40 to 185°F)

Shipping Weight

- 10.3 kg (23 lbs)

Agency Approvals

- UL® 508 listed, File #E73741, Vol. three, Sec. two
- C-UL® listed to C22.2 NO. 14
- VDE EN 50178 License 115054
- CE 89/336/EEC (EN61326), Class A with filter, CE 73/23/EEC (EN50178)

Single-Phase Configuration

This configuration can be purchased with any or all the features available on the POWER SERIES, based on customer preference. It is intended for resistive heaters, but can also be used on transformer connected loads in the phase-angle firing mode.

Three-Phase, Two-Leg Configuration

This configuration is intended for zero cross firing only into a stable resistive heater. Typically, a three-phase delta or ungrounded wye connected heater is used and only two of the three V~ line phases are switched. The third-phase is a direct connection through a bussbar on board the POWER SERIES. Heater current monitoring and kVA options are available via the heater diagnostics option.

Three-Phase, Three Leg Configuration

All POWER SERIES options are available with this configuration. It works well with phase-angle firing into a three-phase, three-wire wye or delta connected heater. In this configuration, the more common applications are transformer connected loads with heaters requiring a soft start and/or current limiting.

The three-phase, four-wire configuration is intended for zero cross firing into a three-phase grounded wye/star heater (This is a separate hardware option, model number dependent.)

Single-Phase, Multizone Configuration

This configuration is available in two and three single-phase zones and all the features of a single-phase unit are available. (Note that there is only one alarm relay and all zones in the controller must use the same control method.)

Heater Diagnostics

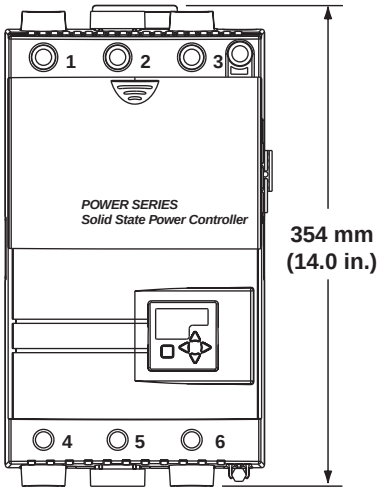
Heater diagnostics may include some or all of the features that require heater current monitoring, depending on the model selected. Heater current monitoring is only available with heater diagnostics installed on the controller. The features dependent on heater current monitoring are heater bakeout, current limiting, heater kVA monitoring, retransmit and heater monitoring alarms such as open heater, heater out of tolerance, load balance and shorted SCR detection/error. Heater diagnostics must also be installed if you need phase-angle control with current limit.

Power Controllers

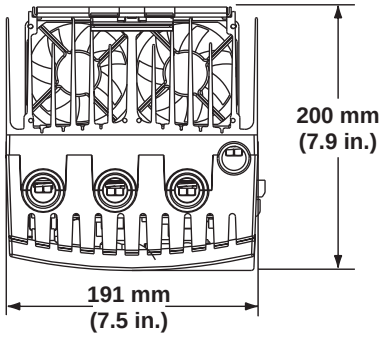
F.O.B.: Winona, Minnesota

POWER SERIES

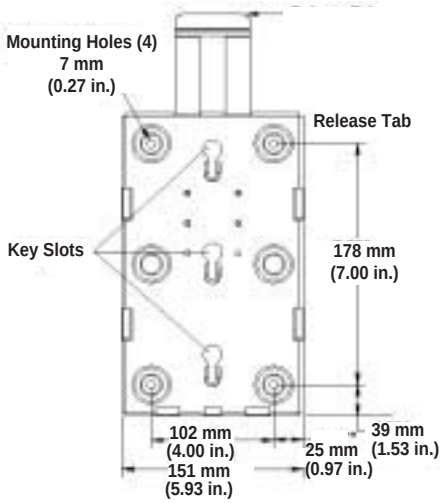
Front View



Top View



Mounting Plate Dimensions



Ordering Information

To order, complete the code number on the right with the information below.

P C ___ - ___ - ___

POWER SERIES = Microprocessor-based, solid state power controller

Package Style

C = 65 to 250 amps

Phase

1 = 1-phase
2 = 3-phase/2-leg control, (4 SCRs)
3 = 3-phase/3-leg control, (6 SCRs)
4 = 3-phase/4-wire, wye connected load
8 = 2 single-phase zones
9 = 3 single-phase zones

Heater Diagnostics

0 = None
1 = Heater diagnostics (required for any heater current monitoring or current limiting).

Output Amperage Rating

(See amperage chart below.)

Output Voltage Rating

A = 24 to 120V
B = 200 to 480V
C = 200 to 600V

Communications

0 = None
1 = EIA/TIA-232/485 communications, opto-isolated (field selectable)

Feedback/Retransmit

0 = None
1 = Load current feedback (0 - 10V or 0 - 20mA scalable retransmit output) Must have heater diagnostics selected)

Custom

00 = None
AA = No watlow logo with agency approval marks
XX = Custom, consult factory for options

Note: See replacement semiconductor fuses on page 190.

Amperage Chart—50˚C (122˚F)

Non-Fan Cooled

Single Phase		2-Zone and 3-Phase, 2-Leg		3-Zone and 3-Phase, 3-Leg	
Code	Amperage	Code	Amperage	Code	Amperage
N20	100A	N20	80A	N20	65A
N25	140A	N25	105A	N25	85A
N30	165A	N30	120A	N30	105A

Fan Cooled

Single Phase		3-Phase, 2-Leg		3-Phase, 3-Leg	
Code	Amperage	Code	Amperage	Code	Amperage
F20	125A	F20	120A	F20	90A
F25	200A	F25	160A	F25	140A
F30	250A	F30	185A	F30	155A

Power Controllers

E-SAFE® RELAY

The E-SAFE® mercury-free relay from Watlow provides reliable and accurate power switching for processing applications.

This relay can exceed the performance of typical mercury relays while fitting within the same footprint. The E-SAFE RELAY bridges the gap between mercury displacement relays (MDRs) and solid state relays (SSRs) by providing superior power switching in a non-mercury solution at a lower cost. This mercury-free relay also provides longer contact life and higher performance than typical mechanical relays used in equipment.

The E-SAFE RELAY eliminates mercury, reduces arcing and electrical noise and provides processors with an excellent solution for equipment power switching. The absence of mercury in the E-SAFE RELAY reduces toxic metal hazards in processing environments.

Performance Capabilities

- Up to 40 amps
- 240 V~(ac)

Features and Benefits

High current transient suppression

- High reliability
- Extended contact life
- Low electrical noise
- Out performs mechanical contactors

Compact size

- Fits footprint of definite purpose relays and most 30 to 50 amp mercury relays
- Easily retrofittable

Environmentally safer than mercury contactors

- Eliminates toxic waste (mercury) from the application environment and disposal from failed mercury contactors

Agency approvals

- UL® 508 listed and C-UL®

Specifications

- Output rating: from 20A to 40A maximum resistive load at -30 to 55°C (-22 to 130°F)
- Maximum power switching voltage: 208/240V~(ac), three pole
- Coil voltage: 24V~(ac), 120V~(ac) and 220V~(ac)
- Maximum operating ambient temperature: 55°C (130°F)
- Maximum cycle rate: 30 cycles per minute

Control Mode

- Zero cross switching output
- Form A outputs, without arcing
- Cycle rate: 30 cycles per minute, maximum

Input Command Signal

- 24V~(ac) (+10 / -15 percent), 120V~(ac) (+10 / -10 percent) 220V~(ac) (+10 / -15 percent)
- 50/60Hz, less than 9VA

Note: Do not place an R/C snubber (filter) on the E-SAFE RELAY input command signal. Do not place on temperature control output.

Output Rating

- 20A to 40A max. per pole into a resistive load
- 208/240V~(ac), 50/60Hz, each pole
- Three pole

Operating Life

- 1,000,000 switching cycles at max. rating

Weight/Dimensions

- Weight: 0.560 kg (1.25 lbs.)
- 96.0 mm (3.78 in.) high x 82.3 mm (3.24 in.) wide x 90.2 mm (3.55 in.) deep

Terminals

- Controller input: Compression, accept #22 to 10 (0.2 to 6 mm^2) AWG wire. Torque to 7 in.-lbs (0.8 Nm) max.
- Output: Compression, accept #14 to 6 (2.5 to 16 mm^2) AWG wire. Torque to 35 in.-lbs max. (3.95 Nm)

E-SAFE RELAY

Specifications Cont.

Operating Environment

- Operating temperature up to -30 to 55°C (-22 to 130°F)
- 5 to 85 percent RH, non-condensing
- Shipping and storage temperature -40 to 85°C (-40 to 185°F)

Mounting

- Definite purpose relay and MDR mounting footprint

Agency Approvals

- UL® 508 listed, C-UL® approved, File #E213822

Ordering Information

To order, complete the code number on the right with the information below.

E S _ _ - _ _ _ - _

E-SAFE RELAY = Hybrid zero cross contactor

Amperage

20 = 20 amp
40 = 30 amp

Number of Poles

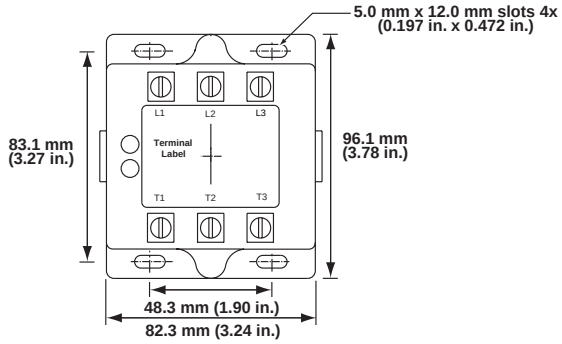
3 = Three pole

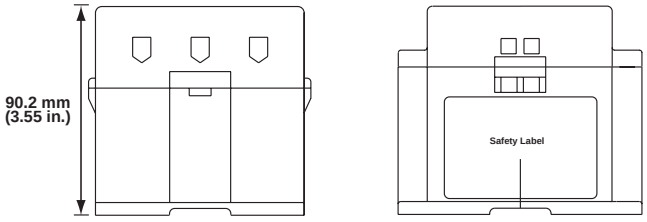
Control Voltage

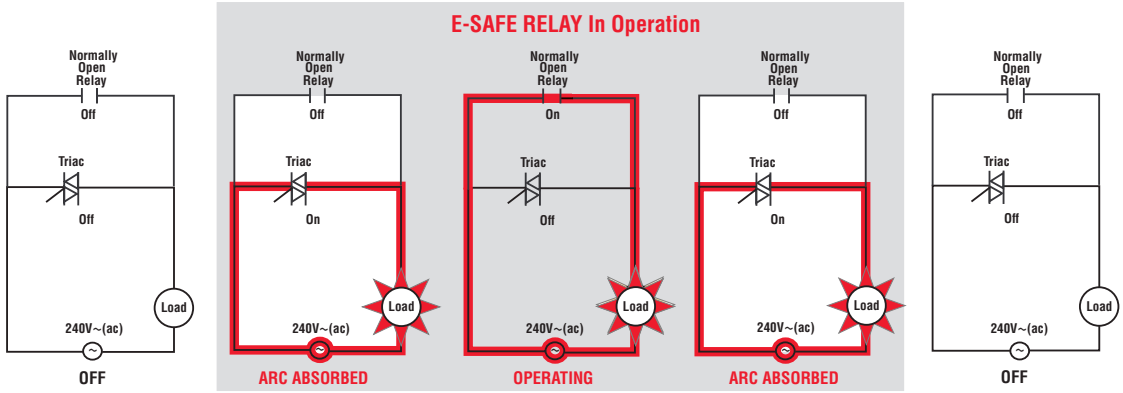
024-AC = 24V~(ac)
120-AC = 120V~(ac)
220-AC = 220V~(ac)

Label Options

00 = Standard product







Power Controllers

Solid State Relays (SSRs)

Lower cost and longer heater life are the main advantages provided by Watlow solid state relays (SSRs). A unique loop-powered firing card permits a very fast time proportional cycle rate of less than one-tenth of a second that allows using higher watt density heating elements and/or increasing heater life. In addition, temperature control accuracy is optimized with this fast cycle card.

Watlow SSRs can be ordered with all the components necessary for hassle-free mounting, including heatsinks, thermal foil and bevel washers along with semiconductor fuses.

Performance Capabilities

- Burst firing, 10 to 75 amps
- Operating environment -25 to 50°C (-13 to 122°F) with proper heatsink
- Can switch up to 575V~(ac)

Features and Benefits

Fast cycle card

- Heater life is increased, temperature control is optimized and higher watt density heaters can be used

Zero cross firing[1]

- Minimal electrical noise

Back-to-back SCR design

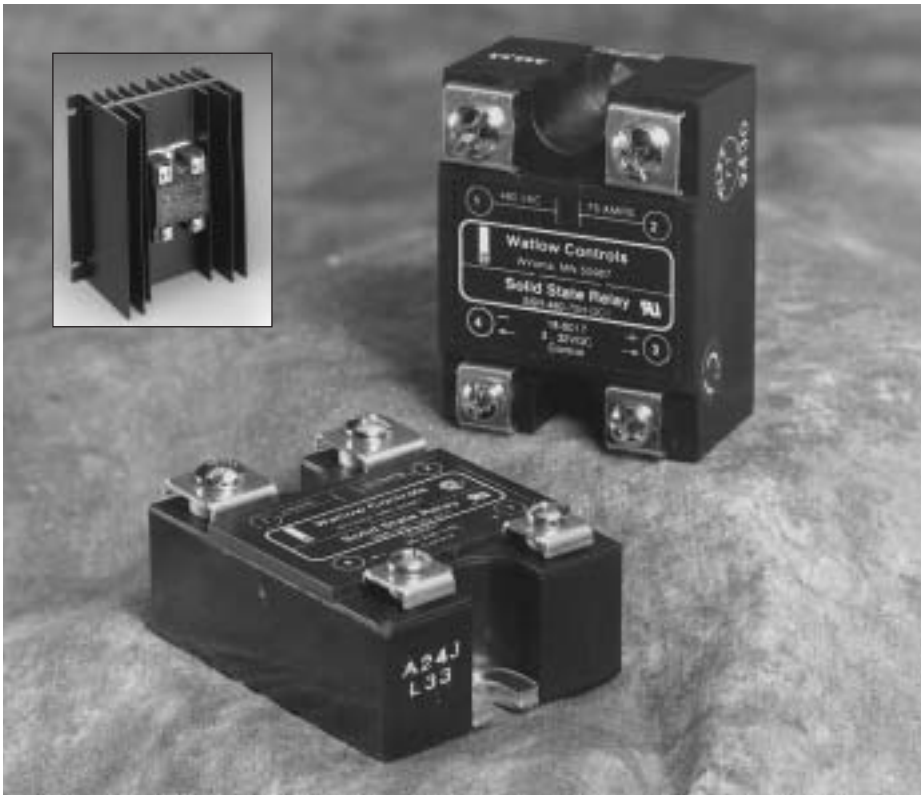
- Will withstand harsh or hostile environments

UL® recognized, CSA certified, VDE licensed

- For applications requiring agency approval

Applications

- Food processing equipment
- Lighting equipment
- Resistive heating



Specifications

Standard to all SSRs:

Agency Approvals

- UL® 873, File #E151484, E73741
- CSA #LR700195
- VDE 0805 EN60950, File #90995ÜG
- CE 60950

Dielectric Strength

- 4000 Volts RMS

DC Control Input

Voltage range

- 3-32V⎓(dc), model no. dependent
- 4-32V⎓(dc), model no. dependent

Input current

- 4mA @ 5V⎓(dc)

Turn on voltage

- 3V⎓(dc) minimum

Turn off voltage

- 1V⎓(dc) maximum

AC Control Input

Voltage range

- 90-280V~(ac)

Input current

- 2mA max. @ 120V~(ac)

Turn on voltage

- 90V~(ac) minimum

Turn off voltage

- 10V~(ac) maximum

Output (Maximum)

Forward voltage drop

- 1.5V~(ac) typically

Minimum holding current

- 50mA~(ac)

Turn on-off time

- 8.3ms

Storage Temperature

- -40 to 85°C (-40 to 185°F)

SSR Weight

- 0.090 kg (0.21 lb)

Shipping Weight

- 0.045 kg (1.0 lb)

[1] Not available on random fired models.

F.O.B.: Winona, Minnesota

Solid State Relays (SSRs)

Ordering Information — Order by selecting the code number from the specifications table below.

Code Number	Output Current (Amps)	Output Voltage	Input Control Voltage	Off State Leakage	One Cycle Surge Current Amps	A^2 Sec. I^2t For Fuse	Thermal Resistance	Frequency Range	Output Voltage Range	PIV Rating
SSR-240-10A-DC1	10	120/ 240V~(ac)	3-32V⎓(dc) Zero Cross	10mA	120	60	1.48°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-25A-DC1	25	120/ 240V~(ac)	3-32V⎓(dc) Zero Cross	10mA	250	260	1.02°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-40A-DC1	40	120/ 240V~(ac)	3-32V⎓(dc) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-50A-DC1	50	120/ 240V~(ac)	3-32V⎓(dc) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-75A-DC1	75	120/ 240V~(ac)	3-32V⎓(dc) Zero Cross	10mA	1000	4150	0.31°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-10A-AC1	10	120/ 240V~(ac)	90-280V~(ac) Zero Cross	10mA	120	60	1.48°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-25A-AC1	25	120/ 240V~(ac)	90-280V~(ac) Zero Cross	10mA	250	260	1.02°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-40A-AC1	40	120/ 240V~(ac)	90-280V~(ac) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-50A-AC1	50	120/ 240V~(ac)	90-280V~(ac) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-240-75A-AC1	75	120/ 240V~(ac)	90-280V~(ac) Zero Cross	10mA	1000	4150	0.31°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-480-25A-DC1	25	480V~(ac)	4-32V⎓(dc) Zero Cross	10mA	250	260	1.02°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-480-50A-DC1	50	480V~(ac)	4-32V⎓(dc) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-480-75A-DC1	75	480V~(ac)	4-32V⎓(dc) Zero Cross	10mA	1000	4150	0.31°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-480-25A-AC1	25	480V~(ac)	90-280V~(ac) Zero Cross	10mA	250	260	1.02°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-480-50A-AC1	50	480V~(ac)	90-280V~(ac) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-480-75A-AC1	75	480V~(ac)	90-280V~(ac) Zero Cross	10mA	1000	4150	0.31°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-600-25A-DC1	25	600V~(ac)	4-32V⎓(dc) Zero Cross	10mA	250	260	1.02°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-600-50A-DC1	50	600V~(ac)	4-32V⎓(dc) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-600-75A-DC1	75	600V~(ac)	4-32V⎓(dc) Zero Cross	10mA	1200	6000	0.28°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-600-25A-AC1	25	600V~(ac)	90-280V~(ac) Zero Cross	10mA	250	260	1.02°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-600-50A-AC1	50	600V~(ac)	90-280V~(ac) Zero Cross	10mA	625	1620	0.63°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-600-75A-AC1	75	600V~(ac)	90-280V~(ac) Zero Cross	10mA	1200	6000	0.28°C/W	47-63Hz	48-660V~(ac)	1200V~(ac)
SSR-240-10A-RND	10	240V~(ac)	4-32V⎓(dc) Random	10mA	120	60	1.48°C/W	47-63Hz	24-280V~(ac)	600V~(ac)
SSR-480-50A-RND	50	480V~(ac)	4-32V⎓(dc) Random	10mA	625	1620	0.63°C/W	47-63Hz	48-530V~(ac)	1200V~(ac)
SSR-480-75A-RND	75	480V~(ac)	4-32V⎓(dc) Random	10mA	1000	4150	0.31°C/W	47-63Hz	48-530V~(ac)	1200V~(ac)
SSR-100-20A-DC1	20	100V⎓(dc)	3-32V⎓(dc)	0.3mA	NA	NA	1.06°C/W	N/A	0-100V⎓(dc)	N/A

Availability

Stock: Same day shipment

Power Controllers

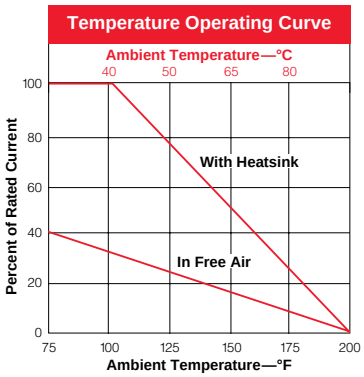
Solid State Relays (SSRs)

Application Hints

Thermal Transfer

A thermal foil is provided with each solid state relay for mounting on the base of the relay to improve heat transfer. In addition, two bevel washers are supplied to provide the proper pressure for the transfer of heat. Use two #8-32 screws, 15.8 mm (0.625 in.) long to secure the relay to the heatsink. See the derating curve, Temperature Operating Curve, for operation without heatsinks.

Note: This rating curve applies only to 10 and 25 amp SSRs. 40 through 75 amp SSRs should not exceed a seven amp load without using a heatsink.



Replacing Contactors or MDRs

Improvements in heater life and control accuracy can be anticipated with solid state relays operated with rapid cycle times as compared to slower operating electromechanical relays or even mercury displacement relays in some applications. When replacing these types of relays with the SSR, it is important to consider two aspects:

1. Heat

Solid state devices require a small voltage to turn on, which is consumed as heat (1.5 watts/amp). This heat must be removed from the device, and is usually accomplished by mounting the relay on heatsinks.

2. Failure Mode

Solid state devices should last for many years when properly protected with voltage and RC suppressors mounted on appropriate heatsinks, and when fused against the high currents caused by electrical shorts.

However, if the unit fails, the most probable condition will be a short. Both mechanical relays mentioned above also have a good probability of failing short. In all cases where uncontrolled full power can cause damage, it is recommended that a high limit temperature controller and contactor be used for protection.

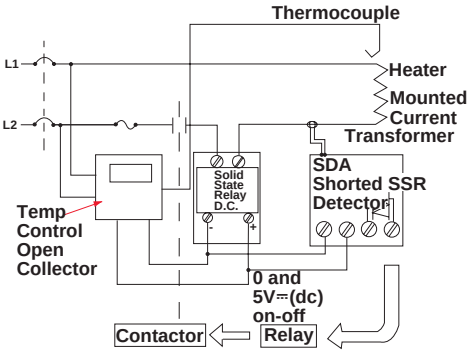
System Diagrams

Shorted SSR Alarm—SDA

The most prevalent concern when using solid state relays is the possibility of a relay failing in a shorted condition. With this in mind, Watlow has designed a cost effective "Shorted SSR Alarm" SDA.

The device monitors the output (current through the heater) and activates a triac (alarm) if there is no command signal from the temperature controller.
The triac can be wired to a bell, or to a normally closed latching relay to remove power to the heater.

Single Phase—SDA



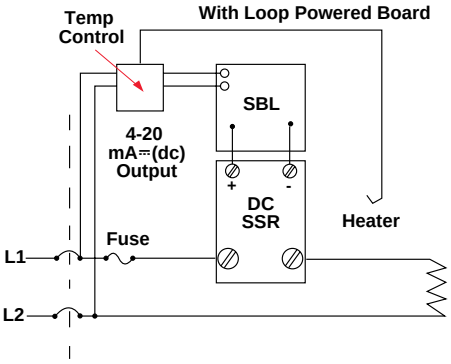
Single-Phase—SBL

4-20mA loop powered firing card for direct mounting on a dc solid state relay. Can be used in three-phase mode with two dc input and zero cross solid state relays (SSR).

Single-Phase—AT and BT

Requires external power switching transformer. Consult factory for part number and voltage required. AT requires a V⎓(dc) input, random fired output SSR. BT requires V⎓(dc) input, zero cross output SSR.

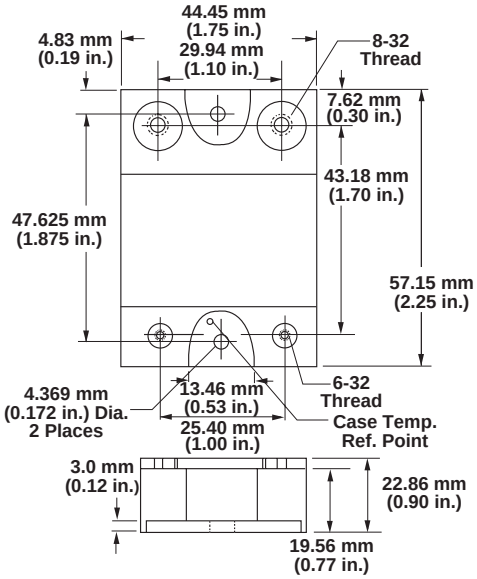
SSR Card	Description	Code No.
SBL	Burst firing 4-20mA only loop powered card for dc input relays only	08-5399
SDA	Shorted SSR alarm for dc input relays only	08-5386
AT	Single-phase, phase-angle firing	08-5422
BT	Single-phase variable time base, single cycle, burst firing, 4-20mA input	08-5406



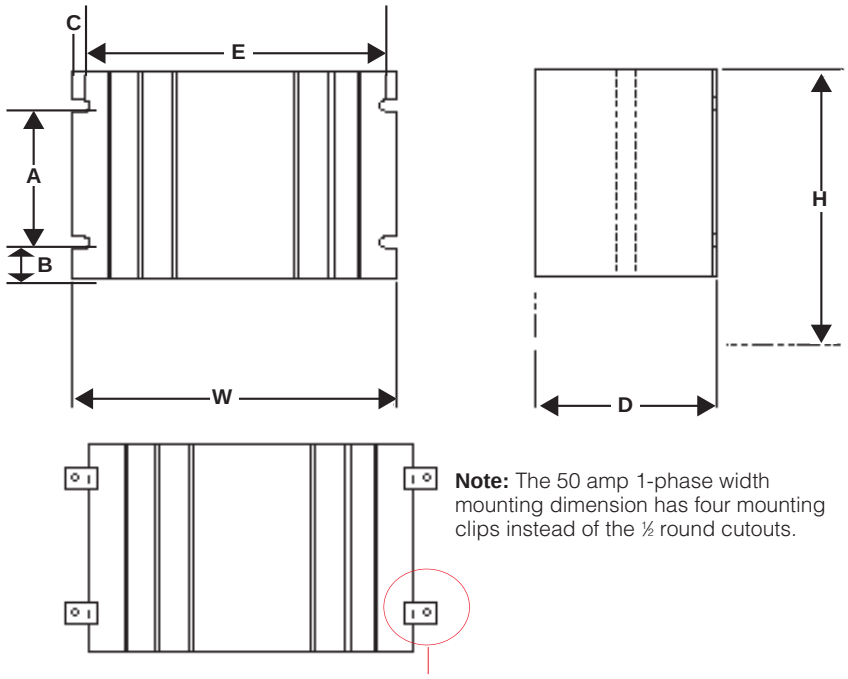
Solid State Relays (SSRs)

Dimensions

Solid State Relay

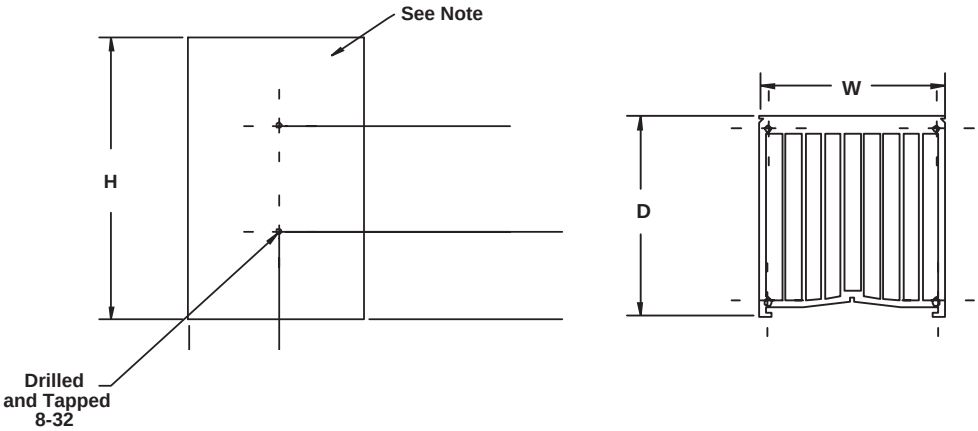


Heatsinks - HS-10, 25, 40, 50 and 75



Note: The 50 amp 1-phase width mounting dimension has four mounting clips instead of the ½ round cutouts.

Z100-0815-000 - A, B and C Heatsinks



Heatsinks – 1-Phase

Amps	Maximum Overall Dimensions						Mounting Dimensions								Fan Cooled	Code Number
	Height (H)		Width (W)		Depth (D)		A		B		C		E			
	mm	(in.)	mm	(in.)	mm	(in.)	mm	(in.)	mm	(in.)	mm	(in.)	mm	(in.)		
10	100	(4.00)	115	(4.50)	25	(1.03)	75	(3.00)	12	(0.50)	4	(0.15)	105	(4.20)	No	**HS-10**
18	94	(3.70)	46	(1.80)	48	(1.90)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	**Z100-0815-000A**
25	75	(3.00)	120	(4.75)	65	(2.60)	50	(2.00)	12	(0.50)	4	(0.15)	115	(4.45)	No	**HS-25**
35	94	(3.70)	81	(3.20)	74	(2.90)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	**Z100-0815-000B**
40	140	(5.50)	120	(4.75)	65	(2.60)	115	(4.50)	12	(0.50)	4	(0.15)	115	(4.45)	No	**HS-40**
50	230	(9.00)	125	(5.00)	90	(3.50)	175	(7.00)	N/A	N/A	N/A	N/A	150	(5.90)	No	**HS-50**
55	145	(5.70)	81	(3.20)	91	(3.60)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	**Z100-0815-000C**
75	190	(7.50)	125	(5.00)	140	(5.50)	175	(7.00)	25	(1.00)	4	(0.15)	120	(4.70)	Yes[2]	**HS-75-1**
75	190	(7.50)	125	(5.00)	140	(5.50)	175	(7.00)	25	(1.00)	4	(0.15)	120	(4.70)	Yes[3]	**HS-75-2**

[2] Heatsink includes fan; requires customer to supply and wire 120V~(ac) to the fan.
[3] Heatsink includes fan; requires customer to supply and wire 240V~(ac) to the fan.
Note: Z100-0815-000 A, B and C are DIN-rail or back panel mount heatsinks.

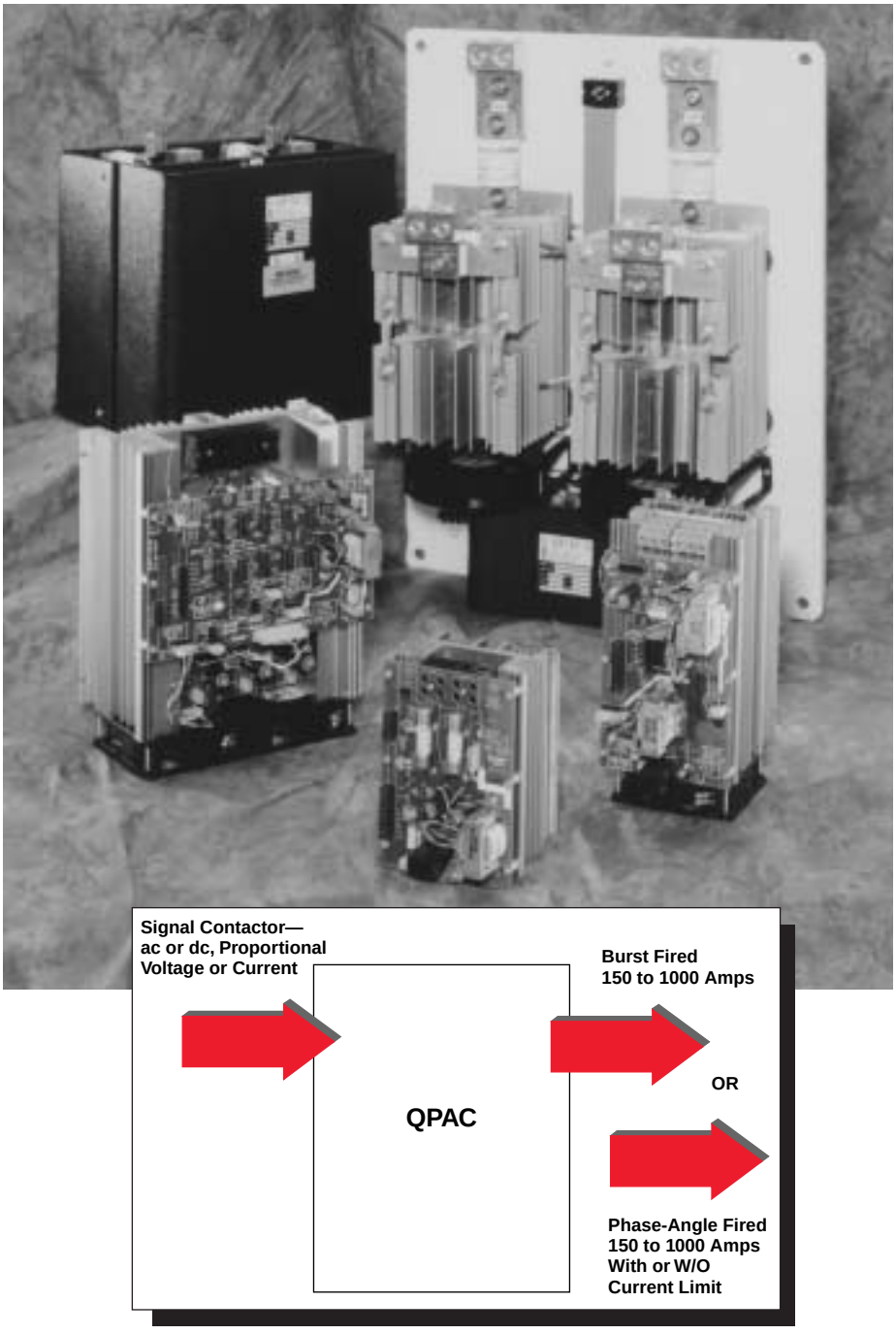
Power Controllers

QPAC SCRs

Watlow's modular QPAC SERIES SCR power controller features plug-in flexibility with ratings from 150 to 1000 amps in 1-phase, 3-phase, 2-leg and 3-phase, 3-leg. A variety of transformers from 120V~(ac) to 575V~(ac), along with 50/60Hz operation, enables the QPAC to operate virtually anywhere in the world. Firing modes are defined by plug-in cards that set the QPAC for:

- Burst fire variable time base
- Phase-angle operation
- Burst fire firing to act as a solid state contactor

Models are available with a wide variety of options. High speed semiconductor fuses are included to protect the SCR from higher currents. This modular approach, using a standard base and plug-in transformers and control cards, allows quick shipment of a power controller specifically tailored to a particular application.



Performance Capabilities

- Available in ratings from 150 to 1000 amps
- Ambient operating temperatures 0 to 50°C (32 to 122°F)

Features and Benefits

Completely modular power controller

- Delivers application flexibility with a variety of plug-in transformers and control cards

Available in 150 to 1000 amp ratings

- Provides appropriate power switching for small and large loads

Burst firing, solid state contactor and phase-angle firing modes

- Meets most application requirements

High speed semiconductor fuses and RC snubbers

- Protects the SCR from voltage or current surges or spikes

High capacity heatsinks for 50˚C (122˚F) ambient operation

- Allows using full power rating in industrial applications

Open heater or shorted SCR detector option

- On burst fire models, provides diagnostic capability

Standard models up to 300 amps UL®508 listed and C-UL®

- For applications requiring agency approvals

Power Controllers

QPAC SCRs

Specifications

Operation

Modular control base with plug-in card and transformer

- Plug-in control cards

  Solid state contactor, ac or dc input

  Burst fire control, fixed or variable time base

  Phase-angle fire control with soft start
- Phase-angle control with soft start and current limiting
- Plug-in transformers (50/60Hz)
- 120, 208, 240, 380, 415, 480, 575V~(ac) operation

Power bases

- Single-phase (Q01), 1 pair of SCRs
- Three-phase (Q32), 2-leg control, 2 pair SCRs. Resistive load only, burst firing only.
- Three-phase (Q33), three pair hybrid SCRs/diodes. Recommended for phase-angle only with balanced load.

Agency Approvals

- UL® 508 and C-UL® Listed, File #E73741

Control Card Inputs

(CA) Solid state contactor, AC input

- 120V~(ac) @ 30mA minimum
- Ac signal input sources (i.e., triacs or mechanical relay outputs with noise suppression) require customer supplied resistors across the power controller ac command signal input terminals to prevent false firing.

  24V~(ac) input, 200Ω/10 watts typical;

  120V~(ac) input, 1kΩ/25 watts typical;

  240V~(ac) input, two 1kΩ/25 watts in series typical

(CD) Solid state contactor, DC input

- On, 4-10V⎓(dc); off, 0.5V⎓(dc)
- Built-in noise reduction network

(BF) Burst firing control fixed time base

- Process input factory set @ 4-20mA⎓(dc)
- Input impedance 250Ω (clip resistor for 5kΩ voltage input), or manual control input
- Time base four seconds (clip resistor for one sec)

(BV) Burst firing control, variable time base

- Process input factory set @ 4-20mA⎓(dc)
- Input impedance 250Ω (clip resistor for 5kΩ voltage input), or manual control input

(AF) Phase-angle control

- Process input factory set @ 4-20mA⎓(dc)
- Input impedance 250Ω (clip resistor for 5kΩ voltage input), or manual control input
- Soft start approximately six seconds upon power-up, one second upon set point change

(AL) Phase-angle control with current limit

- Process input factory set @ 4-20mA⎓(dc)
- Input impedance 250Ω (clip resistor for 5kΩ voltage input), or manual control input
- Soft start approximately 10 seconds upon power-up, one second upon set point change
- Current transformer included

Open Heater/Shorted SCR Detector

- Triac output
- 24 to 240V~(ac), 300mA @ 25°C, 125mA @ 80°C
- Energizes on alarm
- Holding current 200µA minimum
- Latching current 5mA typical

Outputs

- 120V~(ac) through 575V~(ac)
- One, two, or three leg
- 150 through 1000 amps per leg

Line Voltage/Power

- 50/60Hz ac line frequency
- Voltage: ±10 percent, 120, 208, 240, 277, 380, 415, 480, 575V~(ac)

Line Voltage Compensation

- 10 percent Δ in line, 2 percent Δ in load in the 30 percent to 70 percent power region (AF, AL and BV)

Power Dissipation (Watts)

- 1.5 watts/amps per controlled leg

Isolation

- Command signal to load 1250V~(ac) minimum

Linearity

- Within 2 percent, 30 to 70 percent power region (All units except CA & CD)

Off-State Leakage Current

- 20mA @ 480V~(ac)

SCR Protection

- Semiconductor fuses provided dv/dt 200V/µsec minimum
- MOV① and RC snubber network standard
- (Q32) 3rd leg fuse kit may be used, but not required, with 3-phase, 2-leg models

Mounting

- Heatsink fins must be mounted in vertical orientation

Power Controllers

F.O.B.: Winona, Minnesota

QPAC SCRs

Controller Weights

Amps	1Ø Q01 kg (lbs)	3Ø, 2-leg Q32 kg (lbs)	3Ø, 3-wire Q33 kg (lbs)
150	6.8 (15)	16.3 (36)	22.7 (50)
200	6.8 (15)	16.3 (36)	22.7 (50)
300	6.8 (15)	16.3 (36)	22.7 (50)
400-600	19.9 (44)	38.5 (85)	45.4 (100)
800-1000	22.2 (49)	54.4 (120)	61.2 (135)

Specifications Cont.

Operating Environment

- 0 to 50°C (32 to 122°F)
- 0 to 90 percent RH, non-condensing

Storage Temperature

- -40 to 85°C (-40 to 185°F)

Options

- Manual Control Kit for process input cards (1kΩ potentiometer) order #08-5362 separately

Note

- The Q32 and Q33 models are 50/60Hz line frequency dependent. Specify application line frequency when ordering for proper calibration.

Availability

Shipment within five working days on models up through 300 amps. Beyond 300 amps consult the factory.

Ordering Information

To order, complete the code number to the right with the information below:

Q ___ - ___ - ___ - ___

QPAC = Modular power controller; phase-angle, burst or solid state contactor with fuse(s) and holder(s) included.

Phase

01 = Single-phase
32 = 3-phase,-2 leg (optional 3rd leg fuse kit extra.)
33 = 3-phase, 3-leg

Operating and Output Voltage

12 = 120V~(ac)
20 = 208V~(ac)
24 = 240V~(ac)
27 = 277V~(ac)
38 = 380V~(ac)
41 = 415V~(ac)
48 = 480V~(ac)
57 = 575V~(ac)

Cooling Fan Voltage②

Customer to supply wiring and hook-up.
1 = 120V~(ac)
2 = 240V~(ac)

Output Current (Amps)

150 = 150 amps
200 = 200 amps
300 = 300 amps
400 = 400 amps
500 = 500 amps
600 = 600 amps
800 = 800 amps
01K = 1000 amps

Note: See POWER SERIES and DIN-A-MITE® equivalent products on pages 168 and 175 for 30 through 100 amps.

Input Control Card

CA = Solid state ac input (08-5285) contactor
CD = Solid state dc input (08-5286) contactor
BF = Burst fired, fixed time base (08-5289) 4-20mA
BV = Burst fired, variable time base (08-5342) 4-20mA
AF = Phase-angle fired, not available on Q32 (08-5288) 4-20mA
AL = Phase-angle fired w/current limit, not available on Q32 (08-5411) 4-20mA; includes one current transformer. Add second CT for 3-phase, 3-leg. AL models 75 amps and above require one interstage transformer.

Open Heater/Shorted SCR Detector③④

0 = None
1 = Single-phase operation
2 = Three-phase operation

① MOV comes only on Q33 (3-phase, 3-leg).
② All cooling fans rated @ 20 watts each, must be wired by customer.
③ The open heater/shorted SCR detector is for burst fire operation only.
④ Included one current transformer for 1-phase and two current transformers for 3-phase. Models 150 amps and above require one interstage transformer.

Power Controllers

QPAC SCRs

Amps	Fuse Rating	Recommended Wire Size	Bending Radius mm	(in.)	Lugs Accept Wire No.	Phase Code	Fuse Mounting	Current Transformer
150	200	Triple 0	100	(4)	4 to 3/0	All models	O/B	16-0008
200	250	250 MCM	115	(4.5)	6 to 350 MCM	All models	O/B	16-0045
300	400	500 MCM	205	(8)	4 to 500 MCM	All models	O/B	16-0073
400	500	Dual 250 MCM	380	(15)	2 to 600 MCM	All models	O/B	400A-0004-0286-0400
500	600	Dual 350 MCM	380	(15)	2 to 600 MCM	All models	O/B	500-0004-0286-0500
600	800	Dual 500 MCM	380	(15)	2 to 600 MCM	All models	O/B	600-0004-0286-0600
800	1000	Quad 250 MCM	380	(15)	2 to 600 MCM	All models	O/B	800-0004-0286-0800
1000	1250	Quad 350 MCM	380	(15)	2 to 600 MCM	All models	O/B	1000-0004-0286-1000

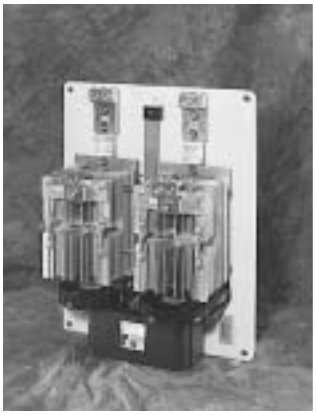
Wiring Information

Note: A circuit breaker (or disconnect) is required in addition to, and at least of the same rating as the semiconductor fuses. Fuse mounting for those controllers with external (EXT) fuses will require space near the terminal block. The space for the fuse will depend upon the current rating. On board fuses (O/B) do not require extra fuse space. Where third-leg fusing is selected, additional space is required. On 575V~(ac) models the fuses are mounted external to the QPAC.

Case Styles

Style C

Style E



Note: Style D eliminated and replaced with Style E.

Q01

Style	Amps	Height (H) mm	(in.)	Width (W) mm	(in.)	Depth (D) mm	(in.)	Weight kg	(lbs)
C①	150	330	(13)	175	(6.9)	255	(10)	6.8	(15)
C①	200	330	(13)	175	(6.9)	255	(10)	6.8	(15)
C①	300	330	(13)	175	(6.9)	255	(10)	6.8	(15)
E①	400-600	685	(27)	430	(17)	300	(11.7)	19.9	(44)
E①	800-1000	685	(27)	430	(17)	340	(13.3)	22.2	(49)

① Includes fan cooling

Q32

Style	Amps	Height (H) mm	(in.)	Width (W) mm	(in.)	Depth (D) mm	(in.)	Weight kg	(lbs)
C①	150	330	(13)	355	(14)	260	(10.25)	16.3	(36)
C①	200	330	(13)	355	(14)	260	(10.25)	16.3	(36)
C①	300	330	(13)	355	(14)	260	(10.25)	16.3	(36)
E①	400-600	685	(27)	535	(21)	300	(11.7)	38.5	(85)
E①	800-1000	840	(33)	535	(21)	340	(13.3)	54.4	(120)

① Includes fan cooling

Q33

Style	Amps	Height (H) mm	(in.)	Width (W) mm	(in.)	Depth (D) mm	(in.)	Weight kg	(lbs)
C①	150	330	(13)	525	(20.7)	260	(10.25)	23	(50)
C①	200	330	(13)	525	(20.7)	260	(10.25)	23	(50)
C①	300	330	(13)	525	(20.7)	260	(10.25)	23	(50)
E①	400-600	840	(33)	685	(27)	300	(11.7)	45.4	(100)
E①	800-1000	840	(33)	685	(27)	340	(13.3)	61.2	(135)

① Includes fan cooling

QPAC Replacement SCRs and Diodes
See page 189

Current Transformers
See page 189

Third Leg (Semiconductor) Fuse Kits
See page 192

Semiconductor Replacement Fuses
See page 192

Power Controllers

F.O.B.: Winona, Minnesota

Accessories

The following accessories and replacement parts are available to enhance the application and service of Watlow power controllers.

To order, simply identify the specification of the desired component and use its part number.

Consult your Watlow representative for availability.

QPAC Replacement SCRs and Diodes

Amps	QPAC Part Numbers		
	Q01	Q32	Q33
150 amp	**18-5052**	**18-5052**	**18-5052**④
200 amp	**18-5052**	**18-5052**	**18-5052**④
300 amp	**18-5052**	**18-5052**	**18-5052**④
400-600 amp	**18-5214**	**18-5214**	**18-5214**④
800 amp	**18-5215**	**18-5215**	**18-5215**④
1000 amp	**18-5216**	**18-5216**	**18-5215**④
Diodes			
150 amp			**18-1044**④
200 amp			**18-1044**④
300 amp			**18-1044**④
400-600 amp			**18-1064**④
800 amp			**18-1068**④
1000 amp			**18-1068**④

④ All units (except Q33) require two SCRs (1 pair) per controlled leg. Q33 (150 amp and above) uses one replaceable diode and one SCR per controlled leg.

Current Transformers

Part No.	Current Ratio
Current Transformer	
16-0230	(See 16-0246)
16-0231	(See 16-0246)
16-0232	(See 16-0246)
16-0233	(See 16-0246)
16-0246①	20 amp: 20mA to 50 amp: 50mA
16-0008②	75 amp: 5 amp
16-0044	100 amp: 5 amp
16-0072	125 amp: 5 amp
16-0008	150 amp: 5 amp
16-0045	200 amp: 5 amp
16-0073	300 amp: 5 amp
0004-0286-0400	400 amp: 5 amp
0004-0286-0500	500 amp: 5 amp
0004-0286-0600	600 amp: 5 amp
0004-0286-0800	800 amp: 5 amp
0004-0286-1000	1000 amp: 5 amp
Interstage Transformer	
16-0176	5 amp: 20mA

Note: An interstage transformer (code no. 16-0176) is required with any current transformer rated 75 amps or above.

① Supercedes code numbers 16-0230, 16-0231, 16-0232, 16-0233.

② Use 2-wire passes through the current transformer 16-0008 for 75 amp applications.

F.O.B.: Winona, Minnesota

Accessories

Noise Suppression Devices

Description	Code No.
MOV, 150V~(ac), 20 joule	**0802-0273-0000**
MOV, 275V~(ac), 15 joule	**0802-0266-0000**
Quencharc® (250V~(ac) max)	**0804-0147-0000**

CE Filters for DIN-A-MITE Products

Code Number	Description	Stocked
14-0019	Single-phase, parallel connected filter	Yes
14-0020	Three-phase, parallel connected filter	Yes

Replacement Fuses for Power Series

Watlow Code No.	Description	Ferraz Part No.	Bussmann Part No.
0808-0102-0100	100 amp @ 600V~(ac)	L330037	170M1317
0808-0102-0125	125 amp @ 600V~(ac)	M330038	170M1318
0808-0102-0160	160 amp @ 600V~(ac)	N330039	170M1319
0808-0102-0200	200 amp @ 600V~(ac)	P330040	170M1320
0808-0102-0250	250 amp @ 600V~(ac)	Q330041	170M1321
0808-0102-0315	315 amp @ 600V~(ac)	R330042	170M1322

Quencharc® is a registered trademark of ITW Paktron.

Power Controllers

F.O.B.: Winona, Minnesota

Accessories

Semiconductor Fuse Selection Guidelines

The following steps will help you identify the proper semiconductor fuse for your application.

1. Semiconductor fuses are required for SCR protection.
2. In North America, semiconductor fuses are considered a specialty fuse and not yet approved for branch circuit or cable protection.
3. All fuses should be rated at 125 percent of the connected load (or the next standard fuse rating above 125 percent). Do not exceed 160 percent of the DIN-A-MITE®.

   For example:

   A 30 amp Style B DIN-A-MITE with a 20 amp connected load should use a 25 amp semiconductor fuse.
4. Due to special applications, cooler ambient temperatures, small loads, etc., the connected load should be the determining factor—although the semiconductor fuse I^2t rating must not exceed the SCR I^2t requirement.

The following charts may be modified following the above guide lines.

Semiconductor Fuses for DIN-A-MITE® Power Controllers

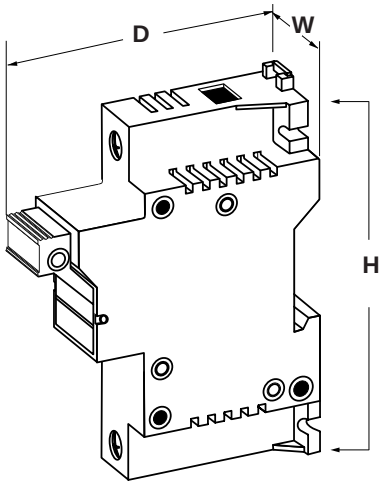
Styles A, B, C and D…Can Also Be Used For VPAC, SSRs and CZR's

DIN-Rail Mount Semiconductor Fuses and Holders

Fuse Amp Rating	Fuse Voltage Rating	Watlow Fuse Part No.	Ferraz Fuse Part No.	Bussman Equiv. Fuse Part No.	Watlow Holder Part No.
12	600	17-8012	H330011	FWC-12A10F	17-5110
20	600	17-8020	K330013	FWC-20A10F	17-5110
25	600	17-8025	L330014	FWC-25A10F	17-5110
32	700	17-8030	M330015	FWP-32A14F	17-5114
40	700	17-8040	A93909	FWP-40A14F	17-5114
50	700	17-8050	B093910	FWP-50A14F	17-5114
63	700	17-8063	T094823	FWP-63A22F	17-5122
65	660	0808-0096-0000	N /A	170N3437	See Note 1
80	700	17-8080	A94829	FWP-80A22F	17-5122
100	700	17-8100	N/A	FWP-100A22F	17-5122

Note 1: Replacement fuse for DIN-A-MITE Style D
Note 2: On part number 17-8030 the fuse is a 32 ampere fuse

Dimensions



DIN-Rail Mount Fuse Holders Maximum Dimensions

Holder Part No.	Height mm (in.)	Width mm (in.)	Depth mm (in.)	Fuse Type (mm)
17-5110	81 (3.18)	18 (0.71)	59 (2.32)	10 X 38
17-5114	111 (4.36)	26 (1.02)	77 (3.03)	14 X 51
17-5122	128 (5.04)	35 (1.38)	77 (3.03)	22 X 58

Accessories

QPAC Semiconductor Fuses

Description	Part No.	QPAC Models Used On
20 amp @ 700V~(ac)	**17-7071**	All Q01 30 amp - 2 fuses required
30 amp @ 700V~(ac)	**17-7072**	All Q01 50 amp - 2 fuses required
40 amp @ 700V~(ac)	**17-7007**	All Q32 and Q33 30 amp
70 amp @ 700V~(ac)	**17-7010**	All Q32 and Q33 50 amp
100 amp @ 700V~(ac)	**17-7012**	All 75 amp, 600V QPACs
100 amp @ 500V~(ac)	**17-7050**	All 75 amp, 480V or less QPACs
125 amp @ 500V~(ac)	**17-7051**	All 100 amp, 480V or less QPACs
200 amp @ 500V~(ac)	**17-7053**	All 150 amp, 480V or less QPACs
250 amp @ 500V~(ac)	**17-7054**	All 200 amp, 480V or less QPACs
400 amp @ 500V~(ac)	**17-7056**	All 300 amp, 480V or less QPACs
500 amp @ 500V~(ac)	**17-7057**	All 400 amp, 480V or less QPACs
600 amp @ 500V~(ac)	**17-7058**	All 500 amp, 480V or less QPACs
800 amp @ 500V~(ac)	**17-7059**	All 600 amp, 480V or less QPACs
1,000 amp @ 700V~(ac)	**17-7082**	All 800 amp QPACs
1,250 amp @ 700V~(ac)	**17-7081**	All 1,000 amp QPACs

Third Leg Semiconductor Fuse Kits for QPAC and VPACs

Description	Part No.	Dimensions A mm	A (in.)	B mm	B (in.)	C mm	C (in.)
One 15 amp fuse, one 1-phase holder	**3LF-10**	85	(3.25)	110	(4.25)	120	(4.75)
One 25 amp fuse, one 1-phase holder	**3LF-20**	85	(3.25)	110	(4.25)	120	(4.75)
One 40 amp fuse, one 1-phase holder	**3LF-30**	110	(4.25)	135	(5.25)	145	(5.75)
One 70 amp fuse, one 1-phase holder	**3LF-50**	110	(4.25)	135	(5.25)	145	(5.75)
One 100 amp fuse, one 1-phase holder	**3LF-75**	90	(3.50)	115	(4.50)	125	(5.00)
One 125 amp fuse, one 1-phase holder	**3LF-100**	90	(3.50)	115	(4.50)	125	(5.00)
One 200 amp fuse, one 1-phase holder	**3LF-150**	90	(3.50)	115	(4.50)	125	(5.00)
One 250 amp fuse, one 1-phase holder	**3LF-200**	85	(3.28)	20	(0.76)	150	(6.00)
One 400 amp fuse, one 1-phase holder	**3LF-300**	85	(3.28)	20	(0.76)	150	(6.00)
One 500 amp fuse, one 1-phase holder	**3LF-400**	85	(3.28)	20	(0.76)	150	(6.00)
One 600 amp fuse, one 1-phase holder	**3LF-500**	85	(3.28)	20	(0.76)	150	(6.00)
One 800 amp fuse, one 1-phase holder	**3LF-600**	Consult factory					
One 1000 amp fuse, one 1-phase holder	**3LF-800**	Consult factory					
One 1250 amp fuse, one 1-phase holder	**3LF-1000**	Consult factory					

Note: For safe operation, fuses must be rated 125 percent of power controller rating. Example: 100 amp power controller should use a 125 amp semiconductor fuse. This 125 amp fuse is already included in the above 3LF-100 fuse kit.

Fuse Block Dimensions